

Report on China's Renewable Energy Law

APP Project REDG-06-09

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1. Introduction and overview

1.1 Background to this paper

Asia-Pacific Partnership

The Asia-Pacific Partnership on Clean Development and Climate (**APP**) is a voluntary multi-national partnership between the Governments of seven nations in the Asia-Pacific region – Australia, Canada, China, India, Japan, Republic of Korea and the United States of America. It was launched on 12 January 2006.

The APP aims to strengthen existing bilateral and multilateral arrangements and create an international framework within which the participant nations will co-operate to pursue development, energy, environment and climate change objectives.

The APP's charter states that the purposes of the APP are to:

- create a voluntary, non-legally binding framework for international cooperation to facilitate the development, diffusion, deployment, and transfer of existing, emerging and longer term cost-effective, cleaner, more efficient technologies and practices among the Partners through concrete and substantial cooperation so as to achieve practical results;
- promote and create enabling environments to assist in such efforts;
- facilitate attainment of our respective national pollution reduction, energy security and climate change objectives; and
- provide a forum for exploring the Partners' respective policy approaches relevant to addressing interlinked development, energy, environment, and climate change issues within the context of clean development goals, and for sharing experiences in developing and implementing respective national development and energy strategies.

Renewable Energy & Distributed Generation Task Force

APP established eight public-private sectors task forces. The Renewable Energy and Distributed Generation Task Force (**REDGTF**) was formed to focus upon issues associated with renewable energy and distributed generation technologies.

The REDGTF aims to:

- facilitate the demonstration and deployment of renewable energy and distributed generation technologies in Partnership countries;
- identify country development needs and the opportunities to deploy renewable energy and distributed generation technologies, systems and practices, and the enabling environments needed to support wide-spread deployment, including in rural, remote and peri-urban applications;
- enumerate financial and engineering benefits of distributed energy systems that contribute to the economic development and climate goals of the Partnership;

- promote further collaboration between Partnership members on research, development and implementation of renewable energy technologies including supporting measures such as renewable resource identification, wind forecasting and energy storage technologies;
- Support cooperative projects to deploy renewable and distributed generation technologies to support rural and peri-urban economic development and poverty alleviation; and
- Identify potential projects that would enable Partners to assess the applicability of renewable energy and distributed generation to their specific requirements.

Our project

This paper forms a component of the REDGTF project: Identifying optimal legal frameworks for renewable energy in China and India (the *Project*). The Project is undertaken by Baker & McKenzie and the Renewable Energy and International Law project, with assistance from the Chinese Renewable Energy Industry Association (*CREIA*) and the World Institute for Sustainable Energy (India). It has funding support from the Australian Government and the US Government under the APP.

The Project will consider and assess the legal, regulatory, institutional and policy frameworks in China and India, and the barriers and opportunities facing the renewable energy sectors in those countries.

The Project also involved hosting workshops in India and China to identify and promote best practice for laws and policies promoting renewable energy in developing countries. The final reports present results of the Project's investigations and make recommendations.

The ultimate aim of the Project is to encourage and enhance the capacity for emission reduction efforts in India and China, by promoting legal and regulatory measures which create an environment within which renewable energy and distributed generation technologies are viable.

The Project, while focused on India and China, is intended to provide policy options and recommendations that could be implemented in all APP partner countries.

In relation to China, the Project builds on earlier work undertaken under RE Law Assist, a research and capacity-building project on renewable energy law in China, conducted in 2006-2007 by Baker & McKenzie, the Renewable Energy Generators of Australia, CREIA and the Centre for Renewable Energy Development, with funding from the Australian Government under the Australia-China Bilateral Partnership on Climate Change.

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1.2 China's Renewable Energy Law and this report

Introduction to China's Renewable Energy Law

The Renewable Energy Law of the Peoples' Republic of China (*China*) came into effect on 1 January 2006 – a significant milestone not only for China, but for renewable energy industries in countries around the world.

The Chinese renewable energy market represents a significant opportunity for both Chinese and Australian businesses, given the enormous energy demand increases expected within China in the coming decades, and the leading renewable energy technologies that have been developed in Australia over the past decade. The Renewable Energy Law is an essential platform for diversifying China's energy mix. Australian industry, as a leader in a number of renewable energy technologies, is well placed to help China meet the additional demand for renewable energy as established by the Renewable Energy Law and the subsidiary regulations and regional initiatives that put this law into action.

The Renewable Energy Law itself is a brief umbrella document, which provides the provincial governments with a mandate to develop renewable energy feed in tariffs and quotas for the purchase of renewable energy within their locality.

As part of RE Law Assist, a report was prepared in June 2007 which examined the Renewable Energy Law, and its impact on both China and Australian businesses (*June 2007 Report*).¹ This report found that the Renewable Energy Law was an essential platform for diversifying China's energy mix, but that its nature as a framework meant that government regulations and implementing provincial legislation would play a crucial role in the development of China's renewable energy industry.

China's National Development and Reform Commission (*NDRC*) carried out the first official Government review of the Renewable Energy Law in early 2007. The results of the review, including recommendations from Chinese industry stakeholders, were published on 20 April 2007 and were reviewed in the June 2007 Report. However, the June 2007 Report was published too early to consider the NDRC's Medium and Long-Term Development Plan for Renewable Energy in China. In addition, a host of new environmentally-focussed law and policy has been proposed and/or passed by the Chinese Government (see section 2.5 below).

These developments will have a direct impact both within China and on the investment analyses that Australian businesses will need to undertake when considering China as an investment opportunity.

¹ Available at:
<http://www.bakernet.com/BakerNet/Resources/Publications/Recent+Publications/Renewable+Energy+Law+in+China.htm>

Aims of this review of the Renewable Energy Law

The purpose of the June 2007 Report was, among other things, to assist the Chinese Government, both at national and regional levels, to implement the detailed regulations under the Renewable Energy Law. In doing so, the June 2007 Report examined aspects of existing Chinese legislation or regulations that needed further elaboration or improvement, based on the needs and practice of Government and industry, and drawing on the experience of Australian renewable energy project developers in developing renewable energy projects in a more mature market.

The purpose of this paper is to review the implementation of the Renewable Energy Law since the publication of the June 2007 Report. As such, it builds on the themes set out in the June 2007 Report, particularly with respect to regulatory achievements, policy challenges, the current state of implementation and future issues that will need to be addressed. It is not intended to be an encyclopaedic guide to investing in Chinese renewable energy projects (potential investors should always take project specific legal advice). However, it does outline key national law and policy, together with selected examples of provincial implementation of which investing businesses should be aware.

Structure of this paper

Following this summary, this paper is divided into three sections. Section 2 sets out a summary of the Renewable Energy Law. It is intended to provide an introduction to those unfamiliar with the primary legal rules that the Chinese Government has introduced to date. It concludes with an overview of recent developments in law and policy since the publication of the June 2007 Report.

Section 3 examines the law and policy identified in section 2 in more detail, looking at specific aspects of the Renewable Energy Law and its impact on potential investors. In doing so, it first considers regulation at the national level, before examining selected provincial examples that are indicative of how the national rules have been implemented. Each sub-section in this part of the study concludes by highlighting the key issues that are not yet resolved. Section 4 looks at issues arising with wind power, particularly pricing issues. Finally, section 5 sets out information on some broader issues associated with implementing a project in China, including project approvals, project financing and structuring, projects under the Kyoto Protocol, and protection of intellectual property.

Appendix 1 contains a list of abbreviations used in this paper, Appendix 2 sets out summaries of relevant regulations, policies and standards, and Appendix 3 has details of wind power tariffs.

1.3 Overview of RE markets in China

This section sets out some information about the status of certain types of renewable energy in China, with comments on key issues of which investors should be aware before investing in the following types of renewable energy projects in China.

Wind

Wind power is the fastest growing power generation technology in China. However, the methods for establishing the price paid to wind power generators for the electricity generated are complex. There are two primary pricing methods: prices established by tender under the Central Government's national concession program (for both private and State-owned developers), and prices negotiated on a case-by-case basis for individual wind projects that are not part of the concession program. In addition, provincial governments have established various pricing mechanisms for wind projects. (Wind power pricing is discussed in more detail in Appendix 3 below.)

One issue with the Government's national concession policy is that so far, only Chinese companies have won the tenders to build wind power plants, since the low bid prices appear to have deterred foreign companies from participating due to the low profit margins. The majority of wind power developers in China are Government-owned conventional power generation or energy corporations. These companies can invest in wind projects (which are politically attractive) without receiving commercial returns as the wind projects are typically only a small proportion of their businesses.²

The problems with individually negotiated projects are the fact that prices are often 'guided' by the results of the concession bidding and that these projects have been limited to 50MW each (although they have proven to be the main avenue for new installations).³

China is working hard to amass a domestic base of engineers skilled in wind projects and wind turbine technologies. This aim is furthered by the 'localization' provision of the national concession program, which requires that 70% of the value of turbines installed under the program be manufactured in China. This manufacturing is often undertaken by joint ventures between Chinese companies and subsidiaries of foreign companies. However, China's wind power technology still lags somewhat behind foreign technology.

A further issue is that to date, attention has been focussed more on increasing wind power capacity, without a corresponding increase in the amount of wind power actually generated. Other issues include a need for more resource assessments and upgrades to the electricity grids so the wind power is able to be used to the maximum extent.

² "Rapid Development of Wind Power Market in China", presentation by Shi Pengfei of the Chinese Wind Energy Association at the Clean Energy Council Conference, Gold Coast 24 November 2008

³ Martinot, E & Li Junfeng "Powering China's development: The role of renewable energy" *Renewable Energy World*, January 2008

Solar PV

The market for solar power in China is currently small. Given the price differential between solar power and fossil fuel power, large subsidies are required to support solar photovoltaic (PV) projects, which the Government is not prepared to provide on a large scale. Many of the grid-connected PV systems currently operating in China are Government-commissioned demonstration projects.⁴ However, only approximately 5% of PV systems in China are grid-connected.⁵ The majority of solar power in China is in rural off-grid applications, again supported by Government programs.⁶

Although the domestic market for the purchase of solar panels is cool, the solar panel manufacturing sector is in full swing, raising concerns that there will be excess capacity. Total investment by the top three Chinese solar panel manufacturing companies is predicted to exceed \$1.3 billion by 2008-2010.⁷ Chinese company Suntech, for example, is the world's fourth largest producer of solar cells. The manufacturers currently generate most of their revenues overseas, but the market for solar panels in China is expected to grow.⁸

Other issues facing solar panel manufacturers in China include the shortage of polysilicon, and the relatively low levels of investment in continuing research and development (given the focus on expansion of production capacity).⁹

Solar hot water

Despite the slow uptake of solar PV, China has made great strides with solar hot water and is now the world's largest market for solar hot water systems. Recent growth has been in urban areas, particularly the southern provinces, whereas historically solar hot water was used in rural areas of China. Solar heating is now relatively affordable in China, due to a combination of low cost labour, cheap materials, and competition among a large number of domestic solar companies.¹⁰

National and local government departments, architects, and real estate developers are paying attention to solar hot water and working to promote its use. The NDRC's 'Plan on Enforcement of Utilization of Solar Energy Heating Nationwide', issued in mid-2007, mandates solar hot water heating in new construction. As a result of this

⁴ *Report on the Development of the Photovoltaic Industry in China (2006-2007)*, China Renewable Energy Development Project, June 2008

⁵ *Report on the Development of the Photovoltaic Industry in China (2006-2007)*, China Renewable Energy Development Project, June 2008

⁶ Martinot, E & Li Junfeng "Powering China's development: The role of renewable energy" *Renewable Energy World*, January 2008

⁷ Martinot, E & Li Junfeng "Powering China's development: The role of renewable energy" *Renewable Energy World*, January 2008

⁸ Taylor, S "Sun rises slowly on China's solar energy sector", Reuters Carbon Market news, 18 January 2008

⁹ *Report on the Development of the Photovoltaic Industry in China (2006-2007)*, China Renewable Energy Development Project, June 2008

¹⁰ Martinot, E & Li Junfeng "Powering China's development: The role of renewable energy" *Renewable Energy World*, January 2008

initiative (and other similar provincial policies), solar hot water growth rates are expected to continue at 20%-25% per annum.¹¹

Hydro power

Hydro power makes up by far the greatest proportion of non-fossil-fuel energy in China. In 2005 it formed 16% of China's total power generation (and 23% of China's total installed power capacity).¹² The Government has indicated that it intends to continue developing China's hydro power resources, but that it will take into account environmental and social issues in doing so (see for example the White Paper on China's Energy Conditions and Policy, discussed in section 2.5 below).

Hydro power is not eligible for special support under the Renewable Energy Law, and as such is not discussed in detail in this paper. The pricing and cost-sharing arrangements for hydro power projects are determined on a case-by-case basis, in accordance with existing hydro power policies.

Biomass / Biofuel

The Central Government has set targets for increased use of biomass for power generation, biomass pellets as a solid fuel, biogas for energy and bioethanol as a transport fuel.¹³

Some large-scale biomass power plants are now being developed, using agricultural wastes.¹⁴

However, the Government is aware that increases in biomass/ biofuel use may conflict with producing food and protecting the environment. The Development Plan (see section 2.4) states that cultivated land should not be illegally occupied, food grains should not be excessively consumed and the environment should not be destroyed to produce biofuels or biomass for power.

Geothermal

To date there has been little development of geothermal power projects in China. The Development Plan states that most geothermal resources in China are more suitable for industrial and agricultural heat applications and space heating rather than power generation.

The Beijing Huaqing Geothermal Development Co. Ltd is to develop a geothermal heat pump system for the World Expo 2010 in Shanghai, China.

¹¹ Martinot, E & Li Junfeng "Powering China's development: The role of renewable energy" *Renewable Energy World*, January 2008

¹² *Medium and Long-Term Development Plan for Renewable Energy in China*, section 1.2.1, English version September 2007

¹³ *Medium and Long-Term Development Plan for Renewable Energy in China*, section 4.2, English version September 2007

¹⁴ Martinot, E & Li Junfeng "Powering China's development: The role of renewable energy" *Renewable Energy World*, January 2008008

2. Renewable Energy in China – background and developments

2.1 Background – Energy in China

China's current and projected coal consumption and GHG emissions

China's energy sector is in many ways unique, not least because of its high dependence on coal, which accounts for approximately 70% of China's total energy – China has little petroleum and natural gas resources. (By way of comparison, the United States relies on coal for approximately 25% of its total energy.)¹⁵ China's coal production has more than doubled since 1990, from one billion tonnes to approximately 2.62 billion tonnes in 2007, making it the world's largest coal-producer and coal-consumer.

China is now estimated to emit as much, or more, greenhouse gas than the United States, and therefore is (or soon will be) the world's largest emitter of greenhouse gases.

Despite China's low emissions per capita and declining rate of emissions intensity (emissions per unit of GDP), the trend in total emissions growth is likely to continue, as development continues and per capita energy use increases. By 2030 (or earlier) it is thought that China will account for 39% of the worldwide increase in carbon dioxide.

Energy market reforms

China's State Council approved the plan for structural reform of the power industry in April 2002 (*Reform Policy*). The main tasks identified in the Reform Policy include:

- separation of plant and grid;
- restructuring of power regulatory bodies and establishment of the State Electricity Reform Commission (*SERC*);
- establishment of a competitive electricity market;
- implementation of power tariff reform;
- formulation of environmental cost standards and surcharges for emissions; and
- formulation of a pilot program where generators directly supply power to large subscribers.

Before the Reform Policy period, the State Power Corporation (*SPC*) controlled 46% of China's electricity generation and 90% of China's grid operations, and all provincial and autonomous region power companies were affiliates of the SPC, with exception of the Guangdong Power Group, the Inner Mongolia Autonomous Region Group, and Hainan Province Power.

¹⁵ Leggett, J, Logan, J & Mackey, A *CRS Report for Congress: China's Greenhouse Gas Emissions and Mitigation Policies*, 10 September 2008

Power generation companies

After the reform, the SPC was broken into three parts, which consisted of power generation assets, grid assets and service companies. The SPC’s power generation assets were restructured into the following power generating companies, each of which is limited to no more than 20% of the generating capacity in each regional network: China Huaneng Group, China Datong Generation Group, China Huadian Group, China National Power Group, China Power Investment Group, and North China Power Group. Each of these generating companies has one or more China- or Hong Kong-listed companies. However, these companies remain ultimately controlled by the state.

China’s electricity grid

As a result of the separation of plant and grid under the Reform Policy, the SPC’s grid assets were restructured into the State Grid Company (a wholly state-owned company) and the Southern Power Grid Company.

The State Grid Company has several subsidiaries, which span most north and central China – the North China Power Grid Company, the Northeast Power Grid Company, the East China Power Grid Company, the Central China Power Grid Company and the Northwest Power Grid Company. In contrast, the Southern Power Grid Company’s scope covers south and southwestern China – Yunnan, Guizhou, Guangxi, Guangdong and Hainan provinces.

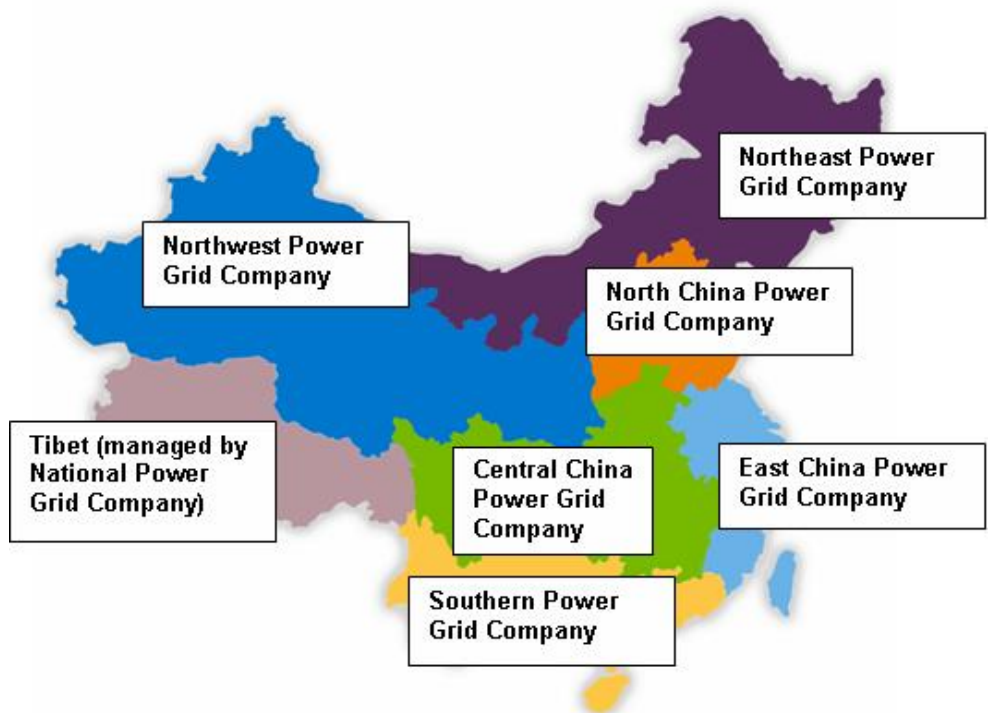


FIGURE 1: GRID COMPANY SUBSIDIARIES

2.2 Introduction to renewable energy in China

Renewable energy industry profile

China's renewable energy industry is growing. From approximately 8% currently, China's target is to increase renewable energy to 15% of its energy mix by 2020. China invests extensively in renewable energy development. Such spending is largely pragmatic, since the country is becoming increasingly poor in many energy resources in per capita terms.

As well as satisfying pragmatic concerns relating to access to energy, China is also concerned about its international environmental image. Some of China's emissions have been transported to nearby South Korea and Japan by strong winds, which may affect its relations with key trading partners. Indeed, China's "green" Olympics in 2008 were partly designed to showcase its willingness to adopt renewable energy.

The Renewable Energy Law is aimed at ensuring China's energy security while protecting the environment.

Key government players in renewable energy

It is widely recognised that China's economic growth is linked to energy resources. Premier Wen Jiabao, China's Prime Minister, has indicated that energy supply will be one of the greatest possible inhibitors to the growth of GDP. Given that energy is such a priority, the State Council has appointed an energy coordination task force under the leadership of Premier Wen Jiabao. The State Energy Office, which operates at a ministerial level, will report directly to the task force. This taskforce replaced the Ministry of Energy that was established in 1988.

The key environmental monitor is the Chinese State Environment Protection Agency, which is gaining strength, as demonstrated when it halted construction of several dams and power stations because their full environmental impacts had not been considered.

Government policy on environment and GHG emissions

While on one hand, several key figures in the Chinese Government have demonstrated a commitment to the environment, such a commitment is tempered by the realities of a still-growing economy and GDP, which have increased energy usage exponentially. The Kyoto Protocol itself notes the potential for conflict between environmental objectives and the need to continue economic growth, since, as a developing nation, China is a signatory to the Protocol without being obliged to take on binding targets to reduce greenhouse gas emissions. China does, however, have institutional and reporting obligations under the Kyoto Protocol.

Nevertheless, China has made some tangible steps towards reducing its emissions. In 1995, the US Department of Energy and the Chinese Government signed a Protocol for Cooperation in the Fields of Energy Efficiency and Renewable Energy Development and Utilisation. China signed Annex II to the Protocol the following year, which signalled its commitment to large-scale deployment of wind energy systems.

Furthermore, while China's carbon dioxide emissions rose rapidly between 1978 and 1996, the rate of increase slowed between 1996 and 2000, although the Chinese economy grew by 36%. To ensure continued economic growth with decreasing emissions intensity, technology development to implement newer, less-polluting facilities is considered a high priority.

However, the experience of dams and power stations in operation in 2006 suggests that the environmental impact of constructing such facilities may need to be reviewed. In that year, China halted work on building 22 major dams and power stations because the Chinese State Environment Protection Agency stipulated that the projects, worth a total of US\$14.65 billion, could not proceed until their environmental effects had been considered.

History of renewable energy measures

The implementation of China's Renewable Energy Law has not been an overnight proposition. Beginning with State Council policies on rural energy in 1983, measures to support renewable energy have included guidelines for wind farm development (1994), the Electric Power and Energy Conservation Laws (1995), renewable portfolio standards models (2000), studies into feed-in tariffs, quotas and renewable portfolio standards (2002) and other measures implemented recently by the Standing Committee of the National People's Congress. The Renewable Energy Law is the first attempt to implement a national framework for the development of all sectors of the industry and to create targets for the share of the total electricity market held by renewable energy.

Pollution control

In September 2006, the National Bureau of Statistics and the State Environmental Protection Administration jointly issued a report on adjustments to GDP caused by environmental pollution. According to this report, the economic losses caused by environmental pollution in China in 2004 amounted to 3.05% of China's GDP in 2004.

It is not surprising, then, that pollution control is one of the reasons for the Chinese government's current plan to substantially increase the percentage of high and new energy and renewable energy in its overall energy consumption. The Chinese Government's concerns about pollution control and further implementation of the Renewable Energy Law are likely to lead to more support and access to the relevant markets being provided to private companies in the renewable energy sector in China.

2.3 Formation of the Renewable Energy Law

Legislative division of responsibilities

Under Chinese law, all powers, unless delegated, are centrally exercised by the State Council, which is led by the Premier. The Premier puts forth laws from the National People's Congress and Standing Committee. Accordingly, the National People's Congress and its Standing Committee pass national laws, while the State Council enacts administrative rules and Local People's Congresses make local regulations.

THE RENEWABLE ENERGY LAW – IN BRIEF

The Renewable Energy Law entered into force on 1 January 2006 and covers energy generated from all non-fossil sources (with the exception of nuclear generation). It provides the framework for legislative initiatives, designed to secure the strategic position and future development of renewable energy. These include:

- Renewable energy targets, including both economy-wide and technology-specific targets;
- Compulsory grid connection for renewable energy facilities to the State electricity grid;
- Power pricing arrangements, including feed-in tariffs and competitive tendering systems, to allow renewable energy to compete with traditional, fossil fuel-powered generation; and
- Cost sharing arrangements to divide the costs of renewable energy generation and grid connection equitably amongst utilities and electricity end users.

Rules comprising the Renewable Energy Law

The Renewable Energy Law is a framework that sets the overarching policies that drive the development of the Chinese renewable energy industry. Its importance stems from the fact that the development of the industry is, for the first, put on a statutory footing. The overarching policies enshrined in the Renewable Energy Law are put into practice through implementing regulations.

In China the Central Government is responsible for formulating national regulations to guide individual provinces during the implementation process. Instructions regarding pricing, cost-sharing, taxation and the project approvals process are stipulated by the Central Government for the provincial government to follow.

However, since there are great disparities between various provinces in terms of resource availability, industrial capacity and demand, in some cases provincial governments have needed to formulate their own detailed provisions for their area within the Central Government's general policy framework. Selected examples of provincial implementing measures are considered in section 3.

Although some national and provincial regulations have been introduced, the implementation of the Renewable Energy Law is an ongoing process. The key recent developments since the publication of the June 2007 Report are set out in sections 2.4 and 2.5 below.

In addition to national and provincial regulations, policy documents and technical standards have been (and continue to be) published, which provide guidance on specific topics. These texts are mentioned in the relevant sections of this paper, and Appendix 2 provides an overview of the national implementing texts.

2.4 Medium and Long-Term Development Plan for Renewable Energy

The NDRC issued the Medium and Long-Term Development Plan for Renewable Energy in China (*Development Plan* – envisaged in Article 8 of the Renewable Energy Law) in September 2007. It is the most important supporting document issued to date in relation to implementation of the Renewable Energy Law, as it is intended to put forward "guiding principles, objectives and targets, priority sectors, and policies and measures for the development of renewable energy in China up to 2020."

The Development Plan has sections on the renewable energy resource potential, and current level of development, for hydro, biomass, wind, solar and geothermal power. It sets out targets for uptake of these types of renewable energy for 2010 and 2020 – these targets are outlined in section 3.1 below.

However, the other sections of the Development Plan, discussed below, are more general in nature and do not provide a significant level of detail on proposed new measures.

Guiding principles for RE development

The Development Plan briefly lists the following as "guiding principles" for renewable energy development in China:

1. Conscientiously implement the Renewable Energy Law;
2. Adopt renewable energy development as one of the key strategic measures to achieve China's goals of establishing a resource-saving, environmentally-friendly society and realizing sustainable development;
3. Speed up the development and deployment of hydropower, wind power, solar energy, and biomass energy;
4. Promote technical progress;
5. Increase market competitiveness; and
6. Continuously increase the share of renewable energy in China's overall energy consumption mix.

The Development Plan also discusses the issues of:

- *Coordinating renewable energy development and deployment with economic, social and environmental objectives* – ensuring that renewable energy is developed taking into account the location of resources, social needs (such as lack of energy in rural areas), environmental issues (including waste/recycling and environmental protection) and economic issues, with specific mention of the problems faced by biomass energy in relation to food sources and protection of the environment;
- *Ensuring mutual promotion of the market (demand) and industrial development (supply)* – this should enable a sustainable and stable market for renewable energy; importance is also placed on China developing its own renewable energy technologies;

- *Combining short-term utilization with long-term technology development* – focus should be placed both on renewable energy technologies which are currently relatively mature, such as hydro, biomass and wind power, and on technologies which are less mature but have good prospects, such as solar photovoltaic energy; and
- *Combining policy incentives with market mechanisms* – the Central Government will provide policy incentives to address the issues of energy shortages and lack of access to energy in rural areas, as well as supporting development of a "recyclable economy" (see the Circular Economy Law, adopted on 29 August 2008). The Government will also provide for market mechanisms to promote renewable energy. This dual approach recognises that, while market mechanisms can be efficient, they are not always well suited to solving issues relating to lack of access to energy in poor or remote areas.

National policies and measures

The Development Plan notes that the following policies and measures will be adopted to meet the objectives and targets set out in the Development Plan:

1. *Establish sustainable and stable market demand* – by means of "favourable price policies, mandated market share (MMS) policies, government investment, government concession programs, and other measures."
2. *Improve the market environment* – by a range of measures to be implemented by the state power grid companies (purchasing renewable energy and constructing power transmission lines for renewable energy plants), power dispatch companies (arranging for priority dispatch of renewable energy), fuel wholesale companies (purchasing biofuels), energy administrative authorities under the State Council (formulating regulations for grid connection), and various administrative bodies (developing national standards for solar systems in buildings).
3. *Set renewable power tariff and cost-sharing policies* – as set out in the Renewable Energy Law.
4. *Increase fiscal input and tax incentives* – including by establishing a renewable energy fund, allocating funding at the local level to support renewable energy development, and putting in place preferential tax policies to support research and development relating to renewable energy, the development and deployment of renewable energy and the manufacture of renewable energy equipment.
5. *Accelerate technology improvement and industry development* – by establishing/integrating renewable energy research institutes, developing human resources, increasing technical innovation capabilities, ensuring national scientific and technological development plans include reference to research on technology development and industrialisation of renewable energy, and including renewable energy projects in programs to support the manufacture of equipment. The goals are to establish a basic system of renewable energy technologies by 2010, so that most renewable energy equipment can be manufactured in China, and for China to establish its own intellectual property rights in renewable energy innovations by 2020, so as to be able to deploy renewable energy on a large scale.

2.5 Other developments relevant to renewable energy – laws and policies

New Energy Law

A new Energy Law for China has been drafted and is proposed to come into force in 2009. It is intended to be the foundation energy law to guide and co-ordinate other laws in China's energy sector, thus acting as an overlay for other energy sector laws such as the Renewable Energy Law, Energy Conservation Law, Electric Power Law and their associated regulations and measures. The Energy Law will cover all forms of primary energy, including renewable energy, as well as secondary energy products such as electricity and petrol.

The purposes of the Energy Law include:

- creating a stable, economical, clean and sustainable energy supply and service system;
- increasing energy efficiency;
- ensuring energy security; and
- promoting the co-ordinated development of energy, the economy and society.

The "guiding principles" of the Energy Law include several which are intended to reinforce the Renewable Energy law, such as:

- sustainable development and resource conservation;
- market-based allocation of resources;
- ensuring basic energy supplies and services for all;
- incentivised and restrictive pricing policies for renewable energy and new energy; and
- tax incentives to encourage the development and use of renewable and new energy.

Under the Energy Law, a national energy strategy will be established to guide the sustainable development of China's energy resources and safeguard its energy security. The strategy is intended to extend for a period of 20-30 years, revised and amended every five years. Underneath the national strategy will sit five-year national energy plans and local energy plans, all of which must be consistent with the national energy strategy.

Article 5 of the Energy Law encourages renewable energy and low-carbon energy, in accordance with the Renewable Energy Law and China's National Climate Change Program. It does not appear that the Energy Law is intended to make any substantive changes to the way in which the Renewable Energy Law operates. However, a company undertaking renewable energy projects will need to ensure that it complies with the Energy Law as well as the Renewable Energy Law (and associated regulations).

Energy Conservation Law

A new Energy Conservation Law came into effect on 1 April 2008. It refers to renewable energy in several places.

Under Article 7, the State is to implement an industrial policy that is conducive to energy conservation and environmental protection, restricting the development of industries that consume large amounts of energy and cause pollution, while developing energy-saving and environmentally-friendly industries. The State encourages and supports the development and utilization of new energies and renewable energies.

Under Article 40, the State encourages the installation and use of solar energy in new buildings and in renovations.

Under Article 59, the State encourages and supports the popularization of renewable energy technologies (eg biomass, solar and wind energy). The State also supports the use of non-arable land for development of energy crops.

No specific incentives for these activities are given under this law. However, Article 78 provides that if an electricity grid enterprise fails to implement relevant State laws on prices of electricity entering the grid (which would include the higher prices payable for renewable energy), the national electricity supervisory authority can order that company to redress the breach and compensate generators for any losses.

National Climate Change Program

In June 2007, China took a significant step forward in addressing the risks of climate change with the publication of a new National Climate Change Program (prepared by the NDRC).

The Program outlines steps that China will take to meet the previously-announced goals of improving energy efficiency by 20% in 2010 over 2005 levels, raising the proportion of renewable energy in the primary energy supply to 10% by 2010, actively promoting energy price reform and implementing institutional reforms in the energy sector. It also provides for education and public awareness on environmental issues. Public environmental awareness is becoming increasingly widespread and having a deepening impact on Government decision-making.

The Program contains several statements relating to the Renewable Energy Law. It states that the measures set out in the Program will assist in "vigorously developing renewable energy" (section 3.3.1). Section 4.1.1(1) of the Program states that China will promulgate the Renewable Energy Law as early as possible, implement it in a comprehensive manner, and in addition:

- *further intensify preferential policies to develop and utilize clean and low carbon energy*
- *[d]evelop supportive regulations and policies, prepare national and local programs for renewable energy development, identify development objectives and integrate renewable energy development into assessment indicator systems for the construction of resource-conservative and environmentally-friendly society*

- *[t]hrough legislation and other approaches, [guide and encourage] domestic and international economic entities ... to participate in renewable energy development and utilization.*

Furthermore, section 4.1.1(2) asserts that:

A stable mechanism for [renewable energy] investment will be established through government investment, government concession and other measures. A sustainable and stably expanding market for renewable energy will be fostered, market environment for renewable energy will be improved and obligation of national electricity grids and petroleum sales enterprises under the Renewable Energy Law to purchase renewable energy products will be implemented.

Plan for Environmental Protection

The National Eleventh Five year Plan for Environmental Protection, 2006-2010 (approved by the State government in November 2007) contains a series of priorities and actions regarding protection of the environment. Statements relevant to renewable energy include:

- China will raise the percentage of clean energy in the urban energy mix;
- China will vigorously develop renewable energy;
- China will make more efforts in the development of biogas projects in rural areas;
- China will implement preferential policies for power from renewable energy, including priority grid access or higher electricity prices;
- stricter pollution controls will be imposed on coal-fired plants; and
- the rule of law will be strengthened, with environmental laws to be improved and strictly enforced.

These statements indicate that the State Government sees the development of renewable energy as forming part of its wider efforts to improve the environment in China.

Catalogue for Guidance of Foreign Investment Industries

The NDRC released the latest *Catalogue for the Guidance of Foreign Investment Industries* on 7 November 2007. This version replaces the 2004 version, and came into force on 1 December 2007. The catalogue lists the following industries (among others) as ones in which foreign investment is encouraged:

- the construction and operation of hydro power stations, with power generation as a major activity;
- the construction and operation of new energy power stations (including using solar, wind, magnetic, geothermal, tidal wave and biological energy);
- the manufacture of special equipment for solar battery manufacturing; and
- scientific research and technical services relating to biomass energy technologies.

However, it remains unclear what actually constitutes "encouragement" of projects listed in the "encouraged" category.¹⁶

Circular Economy Law

A law entitled *Circular Economy Law of the People's Republic of China* was adopted on 29 August 2008, to encourage recycling and efficiency of resource use. Several provisions are relevant to renewable energy.

- Article 23: Where possible, areas shall make sufficient use of solar, geothermal and wind energy, as well as other renewable energy sources.
- Article 32: Grid companies must, according to the relevant State laws, conclude a grid connection agreement with an enterprise which generates power from comprehensive use of resources (eg waste heat, slime, coal bed gas, refuse and other low-calorie fuels), provide grid access services and purchase all the electricity sent to the grid from such enterprises.
- Article 34: Agricultural producers and relevant enterprises are encouraged by the State to take advantage of advanced technologies that use crop straws, livestock and poultry excrements, by-products of the agro-product processing industry and waste agricultural films, to develop and use biogas and other forms of energy from biomass.
- Article 46: The State department responsible for determining energy prices shall determine the prices paid for grid electricity produced by the types of projects mentioned in Article 32, so as to encourage the comprehensive use of resources.

White Paper on China's Energy Conditions and Policies

In December 2007, the Information Office of the State Council published China's first White Paper on energy issues. It includes discussion of the promotion of renewable energy in China as follows:

- China will continue to boost hydroelectric power and other renewable energy resources, and to develop substitute energy resources in a scientific way (Section II).
- On the conditions that the environment is protected and issues affecting local people are properly settled, energetic efforts will be made to develop hydropower (Section IV).
- China gives top priority to developing renewable energy. The exploration and utilization of renewable energy resources plays a significant role in increasing energy supply, improving the energy mix and helping environmental protection, and is also a strategic choice of China to solve the contradiction between energy supply and demand and achieve sustainable development. China has earmarked special funds for renewable energy development to support resource surveys, research and development of relevant technologies, building of pilot and

¹⁶ As noted in the *European Business in China Position Paper 2008-2009*, Energy Working Group p. 176, published by the European Union Chamber of Commerce in China

demonstration projects, as well as exploration and utilization of renewable energy in rural China (Section IV).

- China will further the comprehensive development of areas with hydropower resources, speed up the construction of large hydropower stations, develop medium- and small-sized hydropower stations based on local conditions, and construct pumped-storage power stations under appropriate circumstances. It will spread the latest technologies for the utilization of solar energy, methane and other renewable energy sources, and increase their market shares. It will also actively popularize technologies utilizing wind, biomass and solar energy for power generation, and build several million kilowatt wind power bases to achieve industrialization by means of scale power generation. It will actively implement policies supporting renewable energy development, foster a renewable energy market featuring sustained and stable development, and gradually establish and improve an industrial system and a market and service system of renewable energy, so as to promote renewable energy technological advancement and industrial development (Section IV).
- In order to improve energy development in rural areas, China will (among other things):
 - make full use of small-sized hydropower stations, wind energy and solar energy for power generation;
 - actively develop rural household methane and make better use of biomass and solar energy in rural areas;
 - continue popularizing small energy facilities, such as small wind power and hydropower stations, in rural areas; and
 - build green-energy counties for demonstration, and accelerate the exploration and utilization of renewable energy resources in rural areas (Section IV).
- China will encourage foreign investment in exploration and development of unconventional energy resources, and will encourage foreign entities to invest in and operate renewable energy plants (Section VIII).

These are policy statements and do not contain any binding measures in addition to those proposed under the Renewable Energy Law and associated regulations. However, the White Paper indicates the importance the Government places on renewable energy (particularly hydro power).

2.6 Comparison to RE laws in other countries

Introduction

In addition to China, various countries around the world have recognised the growing importance of renewable energy and have passed specific laws, directives, ordinances or provisions for renewable energy in order to ensure the healthy and robust growth of the sector. These directives usually specify long-term renewable energy targets.

European countries are leading the way in this regard and their laws are an important factor in driving growth, evident in the tremendous growth of renewable energy in Europe.

We summarise below some of the specific renewable energy laws from around the world.

Australia: *Renewable Energy (Electricity) Act 2000*

Since January 2001 Australia has had a mandatory national renewable energy target. The target itself has been a modest one to date, intended to contribute an additional 9,500 gigawatt hours of renewable energy per year to Australia's generation mix by 2010. (The Government has promised to expand this to 45,000 gigawatt hours by 2020.) However, the framework implemented to impose this target, the Mandatory Renewable Energy Target Scheme (*MRET*), implemented by Australia's Federal Government in the *Renewable Energy (Electricity) Act 2000* (Cth), has demonstrated that mandatory markets for renewable energy can operate successfully.

MRET is a simple trading system based on the creation, trade and surrender of renewable energy certificates (*RECs*), each REC corresponding to one megawatt hour of electricity generated from renewable resources.

Operation of MRET

The scheme operates by requiring most wholesale purchasers of electricity and certain deemed wholesale electricity purchasers to surrender a number of RECs that correspond to their required contribution to the renewable energy target. Each entity's required contribution is calculated based on a percentage of their share of acquisitions of liable electricity in Australia.

RECs are created by accredited entities, typically electricity generators that generate electricity using eligible renewable energy resources set out in the table below. RECs can also be generated from a series of solar hot water heaters and small-scale generating units. The administrator of the Scheme, the Office of the Renewable Energy Regulator, reported that by 31 December 2007 there were 253 accredited power stations.

As RECs are tradeable, they can be sold to the liable entities to meet their targets. In theory, given the broad participation in the Scheme and the tradability of RECs, MRET is intended to promote renewable energy projects that meet the target at the lowest cost by allowing the market to decide which projects should be undertaken.

RECs can be traded separately from the electricity that enabled them to be created. In fact, the MRET model operates entirely independently from any electricity regulation in Australia, over which the State Governments exercise legislative power.

Eligible renewable energy

Eligible renewable energy sources have been defined under the Act to include:

- hydro
- tide
- wind
- geothermal aquifer
- energy crops
- agricultural waste
- food waste
- bagasse
- biomass based components of municipal solid waste
- sewage gas and biomass based components of sewage
- wave
- ocean
- solar
- hot dry rock
- wood waste
- landfill gas
- food processing waste
- black liquor
- waste from processing of agricultural products
- any other energy source prescribed by the regulations

Penalties

If the liable entity is not able to surrender the required number of RECs by the year end, then it is liable to pay penalties in the form of renewable energy shortfall charges – \$40.00 for each REC by which the liable entity is in shortfall of its target. No penalty is levied if the shortfall is within 10% of the required amount but the shortfall is carried forward to the next year for accounting purposes. The penalty amount has been set out in the *Renewable Energy (Electricity) Charge Act 2000 (Cth)*.

Another provision in the Act allows for the refund of the shortfall penalty under certain conditions. If the liable entity is able to surrender the required amount of renewable energy certificates (equal to the shortfall amount in the year in which the penalty was paid) within 3 years of paying the penalty, then the entity is liable for a refund of the previously paid renewable energy shortfall charge penalty once administrative fees have been deducted.

Impact on electricity costs

The need to purchase and surrender RECs (and the resulting income stream for renewable energy project developers) has increased the cost of electricity in Australia. Virtually all businesses in Australia are paying suppliers or service providers for MRET related costs that are passed through the supply chain in the cost of goods or services – principally, to their electricity retailers in their electricity invoices. Electricity retailers in submissions to the Independent Pricing and Regulatory Tribunal in New South Wales have calculated the additional MRET compliance cost per megawatt hour for electricity retailers in New South Wales to be from AUD\$1.10 to

AUD\$1.25.¹⁷ This is a relatively small percentage of the average cost per megawatt hour in New South Wales of AUD\$41.66 in the financial year 2007-2008.¹⁸

Potential distortions to the ideal REC market

Electricity retailers pass on to their customers the cost of complying with the MRET, and sometimes the cost that electricity users pay might not reflect the actual costs to the retailer of sourcing RECs.

Unless a company is a large consumer of electricity that negotiates its electricity purchase arrangements with its electricity retailers, there is only limited opportunity for individual companies to take control of the required renewable energy or lower-emissions component of their electricity.

Under MRET, large users of electricity do not ordinarily take control of meeting the renewable energy target for the electricity they purchase. However, such an arrangement could be negotiated contractually between the retailer and user, if the electricity user was able and willing to purchase RECs at a lower price than the cost that their retailer would otherwise pass on to them.

Design improvements identified from the operation of MRET

In the course of operation of the MRET, opportunities for improvement have arisen in relation to three design features of the Scheme.

The legislation originally allowed accredited renewable energy generators to delay creating RECs for an indefinite period of time after the corresponding electricity was actually generated. This led to an amount of "latent generation" – electricity generation from renewable resources that had not yet been used to create RECs and so which was not known to the market. Without any market signals as to the potential number of RECs available, liable entities had to guess the potential supply of RECs to meet their targets and this made pricing less transparent. Before the end of the last compliance period there was a spike in the price of RECs, potentially because liable entities had assumed that more RECs would be available from this "latent generation" than were actually made available. The legislation has now been amended so that RECs must be created within 12 months of the corresponding electricity generation.

That round of legislative amendments also changed MRET so that RECs could be surrendered voluntarily, without being used to meet the mandatory target. Before this amendment, a number of companies who offered services for electricity consumers to voluntarily purchase renewable energy under the scheme could only promise that RECs would be purchased and transferred to an account in the registry where they would never be used again. Further, companies who created RECs and other environmental products under other voluntary or mandatory schemes could not voluntarily surrender RECs under MRET to demonstrate that they were not "double dipping" under the rules of those other schemes.

¹⁷ Independent Pricing and Regulatory Tribunal of NSW, *NSW Electricity Regulated Retail Tariffs 2004/05 to 2006/07*, June 2004 p.39.

¹⁸ NEMMCO average annual price data from www.nemmco.com.au, accessed 6 May 2009.

MRET allows renewable energy generators to create RECs for additional generation above their electricity generation on 1 January 1997 (the "renewable energy baseline"). This baseline is set using factors that include historical generation. As a result, some generators have been able to generate RECs from existing generation capacity. Renewable energy project developers have broadly criticised this approach, suggesting that setting the baseline according to historical generation dilutes the market and reduces the reward available for new electricity generation capacity.

MRET framework mirrored for additional targets in States of Australia

Unsurprisingly, the limited additional generation capacity that is likely to be required to meet the small target under MRET has been very quickly achieved.¹⁹ The previous Federal Government declined to increase the target and extend the scheme, which has been an impetus for Australian State Governments to impose their own schemes mirroring MRET.²⁰

Queensland and Victoria have each introduced schemes which operate using a similar trading mechanism to impose their own additional targets. Victoria's Renewable Energy Target Scheme (known as VRET) imposes a target of an additional 3,274 gigawatt hours of electricity to be purchased by retailers (and other wholesale purchasers) in that State from renewable energy sources by 2016, while Queensland's Gas Scheme currently requires electricity retailers (and other liable entities) in that State to source 13% of their electricity from generators using certain lower-emissions fossil fuels (principally, natural gas or certain waste gases).

The current Federal Government proposes to increase the renewable energy targets under MRET substantially, to ensure that by 2020 approximately 20% of energy comes from renewable sources. This may mean that State-based target schemes discussed above will terminate.

Germany: *Renewable Energy Sources Act 2000 (amended 2004)*

The German renewable energy law is a prime example of what properly designed, stable energy policy can do to bolster the growth of renewable energy. It has created a booming internal and external market, for wind and solar technology in particular, and has simultaneously helped Germany towards meeting its greenhouse gas emissions reduction targets.

¹⁹ For example, Dr M Diesendorf of the University of New South Wales, quoted in ABC report by van Santen, J, 20 April 2006; Mascher, S *Right on Target? Australia's Mandatory Renewable Energy Target*, conference proceedings *International Workshop on Legal Issues for Clean Energy and Climate Change*, 21-22 October 2006 Beijing, China p.125 at pp136-9.

²⁰ Stafford, A *Credit where credit's due: A primer of trading schemes for renewable energy and carbon in Australia* (2006) 27(1) Solar Progress 9 at 10.

The stated objective of the Act, introduced in 2000 and revised in 2004, is to:

facilitate a sustainable development of energy supply, particularly for the sake of protecting our climate, nature and the environment, to reduce the costs of energy supply to the national economy, also by incorporating long-term external effects, to protect nature and the environment, to contribute to avoiding conflicts over fossil fuels and to promote the further development of technologies for the generation of electricity from renewable energy sources.

Additionally the Act helps implement EU directives on renewable energy and contributes to the increase in the percentage of renewable energy sources in the country’s power supply to at least 12.5% by 2010 and to at least 20% by 2020.

The Act regulates priority grid connection and transmission for renewable energy and also deals with the purchase and compensation paid for such electricity. Renewable energy sources are defined to include hydropower (including wave power, tidal power, salt gradient and flow energy), wind energy, solar radiation, geothermal energy, energy from biomass including biogas, landfill gas and sewage treatment plant gas as well as the biodegradable fraction of municipal and industrial waste.

The core provision of the Act is to provide priority status for renewable energy, particularly in the compensation paid for such electricity through the mechanism of feed-in laws or minimum price standards. A feed-in law is a legal obligation on utilities to purchase electricity from a renewable source at a preferential purchase price. Producers of renewable energy are guaranteed the sales price and access to market through an obligation from utility companies to purchase the green electricity on an annual fixed-rate basis. The price paid is subject to periodic adjustments by regulators. The price and the duration of the contract are set at levels that maintain investor confidence, allowing healthy growth in the sector in a low-risk environment.

Minimum prices for renewable energy

MINIMUM PRICES FOR RE, 2004 AMENDMENTS (GERMANY)

RE SOURCE	MINIMUM PRICE
Hydropower	At least 9.67 cents/kWh for plants with a capacity up to and including 500 kilowatts and at least 6.65 cents/kWh for plants with a capacity up to and including 5 megawatts.
Landfill Gas, Sewage Treatment Plant Gas and Mine Gas	At least 7.67 cents/kWh up to and including a capacity of 500 kilowatts and at least 6.65 cents/kWh up to and including a capacity of 5 megawatts. The fees paid for electricity from mine gas plants with a capacity of over 5 megawatts are 6.65 cents/kWh. All above the minimum prices shall be reduced annually by 1.5%
Biomass	At least 11.5 cents/kWh up to and including a capacity of 150 kilowatts, at least 9.9 cents/kWh up to and including a capacity of 500 kilowatts, at least 8.9 cents/kWh up to and including a capacity of 5 megawatts and at least 8.4 cents/kWh for a capacity of over 5 megawatts and up to 20 megawatts. All above the minimum prices shall be reduced annually by 1.5%

RE SOURCE	MINIMUM PRICE
Geothermal	At least 15 cents/kWh up to and including a capacity of 5 megawatts, at least 14 cents/kWh up to and including a capacity of 10 megawatts, At least 8.95 cents/kWh up to and including a capacity of 20 megawatts and at least 7.16 cents/kWh for a capacity of 20 megawatts and over. All above the minimum prices shall be reduced annually by 1.0%
Wind	8.7 cents/kWh for first five years till plants achieve 150% of reference yield. After five years the minimum price will be 5.5 cents/kWh. 9.1 cents/kWh for offshore installation for first 12 years for installation before 2010. After 12 years the rate will be reduced to 6.19 cents/kWh. All above the minimum prices shall be reduced annually by 2.0%
Solar	45.7 cents/kWh for ground mounted installations. If the plant is attached to or integrated on top of a building or noise protection wall, the fees shall be at least 57.4 cents/kWh up to and including a capacity of 30 kilowatts, at least 54.6 cents/kWh for a capacity 30 kilowatts and over, and at least 54.0 cents/kWh for a capacity of 100 kilowatts and over. An addition of 5 cents/kWh will be allowed for BIPV systems. All above the minimum prices shall be reduced annually by 5.0%

Source: WISE, 2007

All the above minimum prices are to be paid from the date of commissioning of the plant for a period of 20 calendar years, or 30 years for hydropower plants.

A nation-wide equalization scheme has been implemented to reduce the cost differentials paid by grid operators in different parts of the country for the purchase of electricity from renewable sources. Under the law, energy from renewable sources commands premium prices. The additional costs are included in household electricity bills. The total additional costs are currently estimated to be only about €1 per month per household.

Grid connection

Plant operators are to bear the cost of grid connection and metering while costs associated with grid up-gradation are to be borne by the grid operators. Plant operators are defined as anyone who, notwithstanding the issue of ownership, uses the plant for the purpose of generating electricity from renewable energy sources or from mine gas. Grid system operators are defined as the operators of all types of voltage systems for general electricity supply.

Other issues

Environmental verification organizations are required to issue certificates certifying guarantee of origin of electricity from renewable sources. The Act also requires the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety to prepare progress reports from time to time.

Czech Republic: *Act on the promotion of Use of Renewable Sources 2005*

This Act came into effect in 2005 primarily for regulating the promotion of electricity generation from renewable energy sources in the Czech Republic in accordance to the existing EU laws and directives.

The various objectives that this law wishes to achieve are as follows:

- promote the use of renewable energy sources;
- provide for a constant increase in the contribution of renewable sources to consumption of primary energy sources;
- contribute to sound use of natural resources and sustainable development of society;
- create preconditions for fulfilment of the indicative target for the contribution of electricity from renewable sources to the gross consumption of electricity in the Czech Republic equal to 8% by 2010 and create preconditions for further increases in this share after 2010.

Renewable energy sources have been defined in the Act to include wind, solar, geothermal, hydro, biomass, landfill gas, sewage treatment plant gas and biogas.

Pricing and grid connection

The renewable energy producer has two choices with regard to renewable energy pricing:

- sell the electricity to the grid operator pursuant to the conditions and prices set under this Act; or
- obtain a green bonus for this electricity and sell it on the market.

A green bonus is defined in this Act as a:

financial amount increasing the market price of electricity that is paid by the operator of a regional grid system or transmission system to a producer of electricity from renewable sources, taking account of reduced damage to the environment resulting from use of a renewable sources compared to combustion of fossil fuels, of the type and size of the production plant and of the quality of supplied electricity.

Captive users are also allowed the benefit of the green bonus under the Act. The Energy Regulatory Office is in charge of setting prices for renewable electricity purchase subject to certain conditions laid down in the law. These prices came into effect for the first time in 2007. The above body is also responsible for publishing an annual progress report on the status and progress of renewable energy. Heavy fines have been laid down for non-compliance both for the grid operator and the electricity producer. Preferential grid connection for renewable energy sources is guaranteed under section 4 of the Act and the costs are to be borne entirely by the grid operator.

Wind power plants located over an area of 1 km² with a total installed capacity of 20 megawatts are excluded from the purview of this Act.

Austria: *Green Electricity Act 2003 (amended 2006)*

Austria's Green Electricity Act was established to enact new provisions related to renewable electricity generation and combined heat and power (*CHP*).

This Act regulates various renewable electricity-related matters, including:

- the guarantees of origin of electricity produced from renewable energy sources;
- the obligations to purchase and pay for electricity;
- the preconditions for, and the promotion of, electricity produced from renewable energy sources; and
- the nation-wide equal sharing of costs associated with the promotion of electricity produced from renewable energy sources and from CHP plants.

The objectives of the Act, aimed at protecting the climate and the environment, to:

- achieve the target of 78.1% of electricity from renewable sources by 2010;
- make good use of the means of promoting renewable energy and to try and achieve market maturity for new technologies;
- support CHP plants used for public district heating supply;
- have at least 9% of electricity from hydropower plants with capacity less than 10 megawatts by 2008; and
- promote renewable electricity and provide for a nation-wide burden-sharing scheme for electricity from renewable energy and CHP.

"Renewable energy sources" are defined as renewable non-fossil energy sources (wind, solar, geo-thermal, wave, tidal, hydropower, biomass, waste containing a high percentage of biogenous materials, landfill gas, sewage treatment plant gas and biogases).

The following two areas are eligible for support under this Act:

- Electricity produced from renewable energy sources through minimum price mechanism and the obligation to purchase such electricity. Hydropower plants with a maximum capacity of more than 10 megawatts and electricity from animal meal, spent lye, sewage sludge or waste, save waste containing a high percentage of biogenous materials, are not entitled to the above support.
- Existing and modernized CHP plants used for public district heating are entitled for support in the form of reimbursements for part of the operating costs.

Grid connection and feed-in tariffs

Grid operators are required to treat all connection applications equally and in a transparent manner. They also require to issue "guarantee of origin" certificates for electricity generated from registered renewable projects. There is an obligation to purchase electricity from solar PV nationwide capacity of up to 15 megawatts and a certain percentage of electricity from hybrid and co-firing plants based on renewable energy. CHP plants are eligible for support only if used for public heating and if

primary energy use and CO2 emissions are reduced in comparison to separate electricity and heat generation.

The Act requires new feed-in tariffs to be set for all new renewable electricity plants. Customers are also required to pay a nation-wide uniform support fee (per kilowatt hour of energy supplied to final customers) to create a fund to cover the additional costs.

United Kingdom

The UK has several major Acts covering the use of renewable energy. These are briefly described below.

Sustainable Energy Act 2003

This Act deals with the provisions for the development and promotion of a sustainable energy policy. The Act makes it mandatory for the Secretary of State to publish annually a "sustainable energy report" to indicate progress made towards:

- cutting the United Kingdom's carbon emissions;
- maintaining the reliability of the United Kingdom's energy supplies;
- promoting competitive energy markets in the United Kingdom; and
- reducing the number of people living in fuel poverty in the United Kingdom.

The Act also requires the Secretary of State to specify targets for electricity production from CHP plants.

Energy Act 2004

The Secretary of State is required to publish a strategy for promotion of micro-generation after considering its potential for:

- cutting emissions of greenhouse gases in Great Britain;
- reducing the number of people living in fuel poverty in Great Britain;
- reducing the demands on transmission systems and distribution systems situated in Great Britain;
- reducing the need for those systems to be modified; and
- enhancing the availability of electricity and heat for consumers in Great Britain.

The sources of energy and technologies that are permitted under the micro-generation initiative are:

- biomass;
- biofuels;
- fuel cells;
- photovoltaics;
- water (including waves and tides);
- wind;
- solar power;

- geothermal sources;
- CHP systems; and
- other sources of energy and technologies for the generation of electricity or the production of heat, the use of which would, in the opinion of the Secretary of State, cut emissions of greenhouse gases in Great Britain.

To qualify as micro-generation, the maximum capacity of the above sources are:

- in relation to the generation of electricity, 50 kilowatts; or
- in relation to the production of heat, 45 kilowatts thermal.

The Act also lays down specific guidelines and regulations for the use of areas outside the territorial sea for exploration and exploitation of energy, especially from water and wind energy. There are regulations for the transmission, distribution and supply of electricity generated in such areas and for de-commissioning of such renewable energy projects. The Government has also reserved the right to declare such an area as a "Renewable Energy Zone" for the above purpose.

RPS obligation relating to electricity, under s32(9) of *Electricity Act 1989*

The Renewables Obligation order was first introduced in 2002 and subsequently revised in 2006. Electricity distribution companies are required under this order to produce or source a minimum percentage of their electricity from renewable sources. The minimum yearly percentages are specified below.

MINIMUM PERCENTAGE OF ELECTRICITY TO BE SOURCED FROM RENEWABLE SOURCE 2006 – 2016 (UK)

YEAR	RPS %
2006-2007	6.7
2007-2008	7.9
2008-2009	9.1
2009-2010	9.7
2010-2011	10.4
2011-2012	11.4
2012-2013	12.4
2013-2014	13.4
2014-2015	14.4
2015-2016	15.4

Source: <http://www.opsi.gov.uk/SI/si2006/20061004.htm>

The electricity distribution companies can meet the above obligations by:

- presenting Renewable Obligation Certificates (**ROCs**);
- paying a buy-out fund contribution equivalent to £33.24/MWh in 2006, altered each year in accordance with the Retail Price Index; or
- a combination of the two.

The Office of Gas and Electricity Markets is responsible for monitoring and enforcing compliance with the Renewables Obligation. Their functions include accrediting renewable generators and issuing of ROCs.

Renewable transport fuel obligations

The power to establish a Renewable Transport Fuel Obligation Program is provided under s 124 of the *Energy Act 2004*. From 2008 fuel suppliers must ensure that a certain minimum percentage of their fuel sales is made up of biofuels. The 2010 target has been set at 5% by volume and is likely to deliver a 1 million tonne carbon emission reduction. The operational and settlement mechanism for the program is similar to the renewable electricity obligation explained above.

See: <http://www.dft.gov.uk/pgr/roads/environment/rtfo/>

Climate Change and Sustainable Energy Act 2006

This Act complements the *Sustainable Energy Act 2003* and the *Energy Act 2004*. Its purpose is:

to make provision about the reduction of emissions of greenhouse gases, the alleviation of fuel poverty, the promotion of micro generation and the use of heat produced from renewable sources, compliance with building regulations relating to emissions of greenhouse gases and the use of fuel and power, the renewables obligation relating to the generation and supply of electricity and the adjustment of transmission charges for electricity; and for connected purposes.

Philippines: *Biofuels Act 2006*

The Philippines' *Biofuels Act* of 2006 was signed into law in January 2007. The Act makes the limited use of biofuels (biodiesel and bioethanol) mandatory. The rationale behind the Act is to substitute a fraction of the costly imported crude oil with indigenously made renewable liquid fuel.

The official Government policy as per the law is:

to reduce dependence on imported fuels with due regard to the protection of public health, the environment, and natural ecosystems consistent with the country's sustainable economic growth that would expand opportunities for livelihood by mandating the use of biofuels as a measure to:

- *develop and utilize indigenous renewable and sustainably-sourced clean energy sources to reduce dependence on imported oil;*
- *mitigate toxic and greenhouse gas emissions;*
- *increase rural employment and income; and*
- *ensure the availability of alternative and renewable clean energy without any detriment to the natural ecosystem, biodiversity and food reserves of the country.*

Compulsory use of biofuels

All liquid fuels for motors and engines sold in the Philippines require locally-sourced biofuels components as follows.

- **Bioethanol:** Within two years from the effective date of the Act, the annual total volume of gasoline fuel actually sold and distributed by each oil company in the country must include at least 5% bioethanol. All bioethanol blended gasoline must also contain a minimum of 5% bioethanol fuel by volume, provided that the ethanol blend conforms to the Philippines National Standards (*PNS*).
- Within four years from the effective date of the Act, the National Biofuel Board (*NBB*) created under the Act is empowered to determine the feasibility and thereafter recommend to the Department of Energy (**DOE**) to mandate a minimum of 10% blend of bioethanol by volume into all gasoline fuel distributed and sold by each oil company in the country.
- **Biodiesel:** Within three months from the effective date of the Act, a minimum of 1% biodiesel by volume must be blended into all diesel engine fuels sold in the country, provided that the biodiesel blend conforms to the PNS for biodiesel.
- Within two years from the effective date of the Act, the NBB is empowered to determine the feasibility and thereafter recommend to DOE to mandate a minimum of 2% blend of biodiesel by volume. This may be increased taking into account considerations including domestic supply and availability of locally-sourced biodiesel components.

The Act also includes incentives for biofuel production in the Philippines.

3. Implementation of the Renewable Energy Law

3.1 Renewable energy targets

Introduction

As noted in the June 2007 Report, China's renewable energy industry is growing rapidly. At the moment, renewable energy (other than hydro power) accounts for roughly 8% of China's energy supplies. However, even though this figure represents a notable increase in the use of renewable energy (even since the publication of the June 2007 Report), it is dwarfed by China's use of coal, which supplies almost 70% of the country's energy needs.²¹

Chinese renewable energy targets originate in Articles 4, 7 and 8 of the Renewable Energy Law:

Relevant provisions of the Renewable Energy Law

Article 4 notes the development of renewable energy as a priority for the Chinese Government, and states that this aim can be promoted by establishing overall generation targets for renewable energy and taking corresponding measures to achieve them.

Article 7 adds detail to Article 4, by requiring that the State Council sets national medium and long-term targets that will foster the development of renewable energy in China. As part of its remit, the State Council is required to liaise with the relevant authorities in the provinces, regions and/or municipalities.

Article 8 requires that the State Council prepares a national renewable energy development and utilisation plan, which can be reviewed subject to the approval of the State Council. It also provides for the implementation of that plan by provincial authorities.

National regulations, policies and technical standards

The central national text that gives substance to the targets enshrined in the Renewable Energy Law is the Development Plan. It sets out targets for 2010 and 2020 for various types of renewable energy, as well as targets for ownership of renewable energy capacity by power companies and use of renewable energy in rural areas.

In summary, the Development Plan sets the targets indicated in the following table.

TARGETS UNDER MEDIUM AND LONG-TERM DEVELOPMENT PLAN

RENEWABLE ENERGY	END 2005 ACTUAL	2010 TARGET	2020 TARGET
Proportion of renewable energy in national energy mix	8%	10%	15%
Hydropower (gigawatts)	117	190	300
Wind power (gigawatts)	1.31	10	30

²¹ "Powering China's development: The role of renewable energy" E. Martinot & Li Junfeng, *Renewable Energy World*, January 2008

RENEWABLE ENERGY	END 2005 ACTUAL	2010 TARGET	2020 TARGET
Biomass power (gigawatts)	2.0	5.5	30
Biomass pellets for solid fuel (million tons)	n/a	1	50
Bioethanol (million tons)	1.02	2	10
Biodiesel (million tons)	0.05	0.2	2
Biogas (billion cubic metres)	7	19	44
Solar power (gigawatts)	0.07	0.3	1.8
Solar hot water (million square metres)	80	150	200
Geothermal energy (annual utilisation, in Mtce)	n/a	4	12
Mandated RE capacity (non-hydro) to be owned by power generators that have more than 5 gigawatts of generation capacity (% of total capacity)	n/a	3	8
Rural households to use renewable energy (% of rural households)	n/a	30	70
Green energy counties (where more than 50% of energy is from renewable sources, and biomass waste is utilised)	n/a	50	500

Progress against targets

Although these targets were initially seen as ambitious, some of the 2010 targets have been reached ahead of schedule and there are plans to increase the targets. An economic stimulus package for renewable energy may be released in the next few months (in addition to the previously-announced stimulus packages which included specific allocations for environmental protection). As part of this package, the overall renewable energy target for 2020 may be doubled.²²

The 2010 target for wind power was reached in 2008, and has now reached 12 gigawatts. The 2020 wind power target is likely to be vastly increased, perhaps to over 100 gigawatts. The solar power target may also be increased, as capacity is forecast to reach 10 gigawatts by 2020. Use of solar hot water heaters has also been growing rapidly, with 10% of all Chinese households estimated to have this technology.²³

²² Shen, R & Wong, J "China solar set to be 5 times 2020 target – researcher", Reuters News 5 May 2009

²³ Ling Li "China to push use of solar water heaters", Worldwatch Institute 8 May 2007

Selected provincial measures

The following table gives examples of provincial measures that will assist in achieving the renewable energy targets.

TABLE OF PROVINCIAL MEASURES

REGION NAME	REGULATIONS OR OTHER DOCUMENT	RESPONSIBLE OFFICE
Shanghai	White book for energy policy, which includes the renewable energy development plan	Local DRC
Hainan/ Xintai	Regulation to promote integration of solar hot water into buildings	Provincial construction bureau
Shenzhen	Regulation to promote integration of solar hot water into buildings	City construction bureau
Baoding/ Kunshan/ Wuxi	Establish industrial base of renewable energy power generation	Local government
Yunnan	Certification requirements for installation of solar systems into buildings and set up a regional standards for solar building integration	Provincial construction bureau
Beijing	Regulation for promoting solar systems in rural areas	Local DRC
Shandong	Measures for promoting biogas and renewable energy in rural areas	Provincial government
Hunan	Regulation for renewable energy development in rural areas	Provincial government
Guangdong	Measures for promoting solar energy development, set up a fixed price for wind power as 0.68 Yuan/kWh	Provincial government
Sichuan	Measures for promoting biogas development in rural areas	Provincial government
Mongolia	Measures of the Inner Mongolia Autonomous Region for the Development and Utilization Management of Wind Energy Resources	Provincial government
Gansu	First region to enact a provincial-level bidding policy, in parallel with the national policy, to support wind power.	Provincial government
Jiangsu	Working on first phase of a 10,000 roof program regarding developments for grid-tied or building integrated solar PV, and discussing a feed-in tariff policy with local utilities.	Provincial government
Shenzen	Built 1MW grid-tied solar PV plant on the World Garden Expo building Mandated solar hot water in all new residential buildings below 12 stories in height	Local government

Outstanding issues

RECOMMENDATIONS FROM JUNE 2007 REPORT

- Consider the implementation of utility-level renewable energy targets and a tradeable certificate scheme to effectively link overall targets with chosen policy mechanisms.
- Alternatively, consider strict reporting arrangements to ensure that feed-in tariffs are sufficient to meet established overall renewable energy targets.
- A quota system that requires major power generators to develop a certain number of renewable energy projects could be developed and implemented.
- Consider a system to ensure that targets and tariffs are complied with, including penalties for breach.
- The National Renewable Energy Development Plan should be published as soon as possible, to guide the development of the renewable energy industry and create certainty for investors.

The third and fifth recommendations above have been fulfilled. Progress could still be made on reporting renewable energy use and ensuring compliance with targets.

In relation to the third recommendation, which has been addressed via the Development Plan's mandated renewable energy quotas for power companies, the European Business in China Position Paper notes that the quota requirement has the (presumably unintentional) effect of making Chinese power companies unwilling to partner with foreign investors in renewable energy projects. The Chinese power companies are concerned that foreign investment will dilute the share of installed renewable energy capacity in their portfolio of installed energy capacity, making it harder for the Chinese power company to reach its renewable energy quota. Therefore the mandated renewable energy quota may act as a de facto barrier to foreign companies taking equity in Chinese renewable energy projects.

It may help to address this issue if joint venture companies with majority Chinese shareholding are allowed to account the joint venture's entire renewable energy capacity towards the quota requirements of the Chinese company.²⁴

Key issues of which potential investors should be aware

The growth rate of the renewable energy market in China has declined following over-investment in 2006 and 2007. Particular barriers to wind and solar energy growth include restricted access to grid connection, over supply of wind turbines and limited stimulation of solar markets.

In wind power markets, limited grid capacity is the major factor limiting growth. In 2008 nearly 5 GW of additional wind power capacity was installed. Installed wind power capacity is expected to rise to 25-30 GW by 2010 and 35-40 GW by 2012. Current grid capabilities are unable to cope with the expected increased capacity and it is likely grid bottlenecks will reduce the ability of wind power to access the market. Investors should investigate the capacity of the local grid and government support for grid company expansion.

Wind turbine manufacture also faces over-supply. At present there are more than 50 manufacturers with a total manufacturing capacity of 10 GW. By 2012 this is expected to increase to 15-20 GW and generate an oversupply of turbines. Investors should be cautious regarding investment in new manufacturing and investigate future turbine demand.

Solar power also faces barriers to growth. The domestic market has not embraced solar power,

²⁴ As noted in the *European Business in China Position Paper 2008-2009*, p. 178, published by the European Union Chamber of Commerce in China

and investors should be aware of current slow growth.

The Government should explore policies to increase the take-up of solar power, and the ability of wind power to be used on the electricity grid, before further supporting solar and wind equipment manufacturing industries.

3.2 Price setting

Introduction

Price is the key barrier to the commercialisation of renewable energy as a form of mainstream energy. Therefore it is crucial that the Renewable Energy Law effectively addresses the differential between the price for fossil-fuel power and for renewable energy.

The price of renewable energy is set in one of two ways: governmental designated price (feed-in tariff) and governmental guided price. The latter is the bidding price proposed by the successful bidder through the tendering process.

The way in which prices are intended to be set for each type of renewable energy is briefly summarised below.

HOW PRICES ARE SET FOR EACH TYPE OF RENEWABLE ENERGY

TYPE OF RENEWABLE ENERGY	PRICE SETTING MECHANISM
Wind	A governmental guided price, which is established through the tendering process organized by the price-charging department of the national council. However, in practice prices may be established in other ways, as discussed in more detail in chapter 4.
Solar	Determined on a project-by-project basis. The NDRC approved 4 Yuan/kWh for solar PV projects in Inner Mongolia and Shanghai. In March 2009 a generous subsidy for solar PV systems was announced, providing 20 Yuan per watt-peak for solar panels that are attached to buildings and have a capacity of over 50 kilowatt-peak (in addition to some efficiency requirements). ²⁵ This subsidy is estimated to cover more than half the cost of purchasing and installing solar panels. ²⁶
Biomass and Biofuel	While the Renewable Energy Law provides that the price of biomass may be determined by tender, the practice in China is to set a feed-in tariff.
Geothermal	Determined on a project-by-project basis.
Hydropower	The renewable energy price system does not apply for hydropower. Prices are determined on a project-by-project basis. Projects of 50 MW and above are approved by the NDRC. Projects below that size are approved the provincial DRC.

²⁵ Shen, R & Wong, J "China solar set to be 5 times 2020 target – researcher", Reuters News 5 May 2009

²⁶ Finamore, B "Solar subsidies in China", Switchboard NRDC 7 April 2009

Relevant provisions of the Renewable Energy Law

Article 19—Grid power price of renewable energy power generation projects shall be determined by the price authorities of the State Council in the principle of being beneficial to the development and utilization of renewable energy and being economic and reasonable, where timely adjustment shall be made on the basis of the development of technology for the development and utilization of renewable energy. The price for grid-connected power shall be publicized.

For the price of grid-connected power of renewable power generation projects determined through tender as stipulated in the 3rd paragraph of Article 13 hereof, the bid-winning price shall be implemented; however, such a price shall not exceed the level of grid-connected power of similar renewable power generation projects.

Article 22—For the selling price of power generated from independent renewable energy power system invested or subsidized by the Government, classified selling price of the same area shall be adopted, and the excess between its reasonable operation, management expenses and the selling price shall be shared on the basis of the method as specified in Article 20 hereof.

Article 23—The price of renewable heat and natural gas that enters the urban pipeline shall be determined on the basis of price management authorities in the principle of being beneficial to the development and utilization of renewable energy and being economic and reasonable.

National regulations and policies

The *Provisional Administrative Measures on Pricing and Cost Sharing for Renewable Energy Power Generation* (NDRC Price [2006] No. 7) (here called the **NDRC Price Measure**) sets out details on price setting and cost sharing relating to the feed-in tariffs under the Renewable Energy Law.

The NDRC Price Measure is set out in full below (note that English translations of some terms may differ).

NDRC Price Measure**Chapter 1. General Principles**

Article 1. In compliance with the Renewable Energy Law of the People's Republic of China and the Price Law of the People's Republic of China, these Measures are formulated to promote the development of renewable energy power generation industry.

Article 2. The scope of application of the Measures includes wind, biomass (including power generation from forest and agricultural waste through direct combustion and gasification, solid waste incineration, landfill gas, biogas), solar, geothermal and ocean power generation.

Prevailing regulations on hydropower tariff are still in effect.

Article 3. Renewable energy power generation projects within the boundaries of the People's Republic of China and those to be approved for construction by the relevant governmental authorities in 2006 and beyond shall be governed by the Measures while projects approved for construction by the relevant governmental authorities before December 31, 2005 shall be governed by the relevant existing regulations.

Article 4. Code for pricing and cost sharing for renewable energy power generation projects sticks to the principle of development promotion, efficiency enhancement, standardized administration and fair share.

Article 5. Tariffs for renewable energy power generation are categorized into Government Fixed Price and the Guidance Price of the Government. The Guidance Price of the Government refers to the awarded tariff of the bid winner through competitive tendering.

The incremental cost of renewable energy power generation over the yardstick feed-in tariff for

desulphurizing coal-fired generating units shall be shared among the sales volume of electricity in power grids at the provincial or above level.

Chapter 2. Pricing of Electricity

Article 6. The Guidance Price of the Government applies to the feed-in tariff for wind power projects and the pricing standards will be determined through bidding by the price authorities of the State Council.

Article 7. For biomass power generation projects where the government fixed price applies, the price authorities of the State Council shall set yardstick tariff by region and the price standard shall be the addition of yardstick feed-in tariff for desulphurizing coal-fired generating units in 2005 in respective provinces (autonomous regions, municipalities directly under the Central Government) and subsidy price.

The subsidy price is 0.25 yuan per kilowatt-hour. 15 years of subsidy price shall be enjoyed for power projects starting from the date of power production; the subsidy price shall be annulled after 15 years of operation.

Since 2010, the subsidy price for power generation projects newly approved for construction by the relevant government authorities each and every year shall be decreased by 2% over that approved for construction in the preceding year.

Mixed-fuel power generation projects with the conventional energy exceeding 20% in heat consumption for power production shall be regarded as conventional energy power generation projects and the yardstick tariff of local thermal power plants shall apply without enjoying the subsidy price.

Article 8. For biomass power generation projects with feed-in tariff set through investor bidding, the guidance price of the government shall apply, i.e. the price of the bid winner which shall not be higher than the local yardstick tariff.

Article 9. The Government Fixed Price applies to solar, ocean and geothermal power generation projects and the price standard shall be determined in the principle of reasonable costs plus reasonable profits by the price authorities of the State Council.

Article 10. Sales price to the end-user for public independent power systems from renewable energy is subject to categorized sales price of the local provincial power grid.

Article 11. Power end-users are encouraged to purchase electricity from renewable energy of free will and the tariff is the addition of the power generation price of renewable energy and the average transmission and distribution price of the grid.

Chapter 3. Cost sharing mechanism

Article 12. The incremental cost of: feed-in tariff for renewable energy power generation over the yardstick feed-in tariff for desulphurizing coal-fired generating units, operation and maintenance (O&M) costs of state-invested or subsidized public independent power systems from renewable energy over the average electricity sales price of the local provincial grid as well as the grid connection cost of renewable energy power generation projects will be settled via tariff surcharge levied on the electricity end-users.

Article 13. The renewable energy tariff surcharge shall be levied on the electricity end-users within the service scope of the provincial and above grid enterprises (including wholesale customers of the provincial grid enterprises, auxiliary power plants, and large accounts directly purchasing electricity from the power plants). End-users of county self-provided power grids, end-users in Tibet area and those engaged in agricultural production shall be exempted from such tariff surcharge.

Article 14. Renewable energy tariff surcharge shall be verified by the price authorities of the State Council and metered according to the actual power consumption of the end-users adopting the unified standards throughout China.

Article 15. Calculation formulas for the renewable energy tariff surcharge:

Renewable energy tariff surcharge = the total amount of renewable energy tariff surcharge / total sales volume of electricity at a price with the tariff surcharge throughout China.

the total amount of renewable energy tariff surcharge = Σ [(renewable energy power generation price - the yardstick tariff for desulphurizing coal-fired generating units of the local provincial

power grid) * renewable energy power purchased by the power grid + (O&M costs of public independent power systems from renewable energy - the average electricity sales price of the local provincial grid) * sales volume of public independent power systems from renewable energy] + the grid connection cost of renewable energy power generation projects and other reasonable charges]

Therein:

- (1) total sales volume of electricity at a price with the tariff surcharge throughout China = total sales volume of electricity of the provincial or above grid enterprises during the planning period - power consumption for agricultural production - sales volume of electricity of the Tibetan grid.
- (2) renewable energy power purchased by the power grid = planned power generation from renewable energy – power consumption within the power plant
- (3) O&M costs of public independent power systems from renewable energy = operating cost for public independent power systems from renewable energy * (1+VAT rate).
- (4) the grid connection cost of renewable energy power generation projects and other reasonable charges refer to the engineering investment and O&M costs incurred specifically for the grid connection system of renewable energy power projects, based on the design documents from the relevant government departments. Before the transmission and distribution cost is defined by the State, the grid connection cost shall be temporarily included in the renewable energy tariff surcharge.

Article 16. The total amount of renewable energy tariff surcharge to be apportioned among the provincial grid enterprises is defined according to the proportion of sales volume of electricity at a price with tariff surcharge of the provincial grid enterprises in the total sales volume of electricity at a price with the tariff surcharge throughout China.

Calculation formula as follows:

The total amount of tariff surcharge to be apportioned among the provincial grid enterprises = the national total of renewable energy tariff surcharge * sales volume of electricity at a price with the tariff surcharge within the service scope of provincial grid enterprise / national sales volume of electricity at a price with tariff surcharge.

Article 17. The renewable energy tariff surcharge shall be included in the sales price of grid enterprises, levied by the grid enterprises and kept in separate accounts to be used for specific purposes. Subject to the detailed regulations governed by the state council for preferential tax policies concerned.

Article 18. The renewable energy tariff surcharge shall be adjusted on a timely basis by the price authorities of the State Council according to the actual situation in the development of renewable energy and the adjustment cycle shall not be less than one year.

Article 19. The difference between the subsidy electricity fare actually paid by the provincial grid enterprises and the grid connection costs incurred for renewable energy power generation projects and the apportioned amount of tariff surcharge payable shall be subject to unified allocation in China. Concrete administrative measures will be formulated by the electricity regulatory departments according to the Measures and submitted to the price authorities of the State Council for approval.

Chapter 4. Miscellaneous

Article 20. Renewable energy power generation and grid enterprises shall record and maintain relevant data such as trade volume, price, and amount of power generated from renewable energy to the grid on a true and complete basis and shall accept the inspection and supervision of price authorities, electricity regulatory institutions and auditing departments.

Article 21. Any failure to implement the Measures resulting in loss of corporate and state benefits shall be scrutinized by the price authorities of the State Council, the electricity regulatory departments and auditing departments and the major responsible person shall be tracked down for his responsibilities.

Article 22. The Measure shall take effect on January 1, 2006.

Article 23. The Measures shall be construed by the NDRC.

Government department with price-setting powers

A new National Energy Administration was established in 2008, as part of the creation of a new energy governance system in China. One of its functions is to manage the renewable energy industry. However, it will not have final control over prices for renewable energy, which will continue to be determined by the NDRC. The National Energy Administration may propose new energy prices, but these must be submitted to the NDRC for final approval.

The NDRC will not approve the final feed-in tariff for a renewable energy project until after the project has been constructed.

Furthermore, while the National Energy Administration has the power to approve major investments in overseas energy projects, the NDRC retains the right to make the final decision on major energy projects in China.

Selected provincial measures

In Guangdong province, a unified feed-in tariff has been implemented for wind power projects since March 2008. The tariff was fixed at 0.68 Yuan per kWh, tax included, and is additional to national wind power concession prices.

Outstanding issues

RECOMMENDATIONS FROM JUNE 2007 REPORT

- A feed-in tariff regime for the wind energy industry should be reintroduced in consultation with industry.
- Competitive tendering schemes should be combined with robust technical standards and a floor price to prevent gaming, low contract implementation rates and poor quality projects.
- When the solar power industry is considered sufficiently developed (or to assist in its development), separate government approvals should not be required for solar projects and a predictable and sufficient feed-in tariff should be introduced. Alternatively other forms of support such as tax incentives and/or seed funding could be provided.
- Clarify any existing feed-in tariffs and other support mechanisms at a provincial level and specify how these will be affected by the implementation of the Renewable Energy Law and regulations.

In relation to the first recommendation, there have been some changes to the methods for setting tariffs for wind power – see section 0 for a more detailed discussion. However, the pricing situation for wind power is complex and could be streamlined and improved.

Again, the situation with technical standards has improved, but more could be done – see section 3.7.

The third and fourth recommendations remain to be addressed. It may be preferable for feed-in tariffs to be set at a provincial level rather than a national level, to reflect

regional variations affecting the viability of renewable energy projects. Feed-in tariffs should be stable (although indexed to inflation) and should be made public.²⁷

The fact that the NDRC does not approve final feed-in tariffs for a project until after it has been built means that investors have to decide whether to invest in the project without the benefit of confirmed prices for the power, exposing them to greater risks.²⁸ This could be addressed by the NDRC providing confirmed feed-in tariffs at an earlier stage in project development.

Key issues of which potential investors should be aware

The price of power is set by the NDRC, and the NDRC is unlikely to take into account industry submissions. Therefore some renewable energy feed-in tariffs may still be low by international standards. However, some provinces, including Guangdong, have the right to price power within the province and may allow greater business engagement regarding pricing.

In general, the feed-in tariff for wind power in China is lower than in other countries. International investors should be careful to take this into account when assessing wind project investments.

²⁷ As recommended in the *European Business in China Position Paper 2008-2009*, p.179, published by the EU Chamber of Commerce in China

²⁸ As noted in the *European Business in China Position Paper 2008-2009*, p.178, published by the EU Chamber of Commerce in China

3.3 Cost sharing

Introduction

The aim of the cost-sharing provisions of the Renewable Energy Law is to share the costs of supporting renewable energy between all energy consumers. This approach is taken by many other renewable energy support programs, such as in Germany and Australia.

Relevant provisions of the Renewable Energy Law

Article 20—The excess between the expenses that power grid enterprises purchase renewable power on the basis of the price determined in Article 19 hereof and the expenses incurred in the purchase of average power price generated with conventional energy shall be shared in the selling price. Price authorities of the State Council shall prepare specific methods.

Article 21—Grid connection expenses paid by grid enterprises for the purchase of renewable power and other reasonable expenses may be included into the grid enterprise power transmission cost and retrieved from the selling price.

Article 22—For the selling price of power generated from independent renewable energy power system invested or subsidized by the Government, classified selling price of the same area shall be adopted, and the excess between its reasonable operation, management expenses and the selling price shall be shared on the basis of the method as specified in Article 20 hereof.

National regulations and policies

The primary regulations/ policies relevant to cost sharing include:

- NDRC Price Measure, discussed above
- Renewable energy surcharge level regulation (NDRC Price [2006] No. 28-33)
- Provisional regulation on renewable energy surcharge balancing (NDRC Price [2007] No. 44)
- Provisional Administrative Measures on Renewable Energy Development Fund (MoF Economic and Construction [2006] No. 237)
- Temporary measures of additional income regulation of renewable energy power (NDRC, November 2007).

Summaries of these measures are set out in Appendix 2.

Surcharges and subsidies

In September 2007, the surcharge for renewable energy in 2006 was announced. In 2006, a total surcharge amount of 260.24 million Yuan was collected, divided between:

- 38 wind power projects, biomass projects and solar PV projects, in respect of which 251.46 million Yuan was paid as a subsidy from the national surcharge;
- five public stand-alone wind power and solar power projects, in respect of which 7.62 million Yuan was paid; and
- five wind power grid connection projects, in respect of which 1.16 million Yuan was paid.

In 2006, the subsidy was not able to cover the extra cost of renewable energy in four provinces, namely Xinjiang, Jilin, eastern Inner Mongolia and Tibet. The excess renewable energy from plants in those provinces was sold to the utilities of Jiangsu, Zhejiang, Shandong and Henan. The trade amounted to 91.71 million Yuan, representing 35% of the total surcharge in 2006.

In March 2008, the government announced the surcharge and subsidy arrangements for the period from January to September of 2007. During this period, a total surcharge amount of 714.48 million Yuan was collected (much higher than in 2006). This was divided between:

- 75 wind power projects, biomass projects and solar PV projects, which received a total subsidy of 699.37 million Yuan; and
- 35 grid connection projects for wind power, which received 15.11 million Yuan.

However, this was not able to cover the cost of renewable energy in seven provinces, namely Heilongjiang, Jilin, Eastern Inner Mongolia, Northern Hebei, Shandong, Xinjiang and Ningxia. The excess renewable energy from plants in those provinces was sold to the utilities of Shanxi, Zhejiang, Anhui, Jiangsu, Beijing, Sichuan and Henan. This trade amounted to 178.42 million Yuan, representing 25% of the total surcharge during the first nine months of 2007.

Outstanding issues

RECOMMENDATION FROM JUNE 2007 REPORT

- The details of how the cost-sharing revenue will be divided among the 31 provinces, and how the additional costs will be borne by energy utilities, need to be clarified.

The NDRC measure of November 2007 has assisted in clarifying cost-sharing issues, by setting out further details on cost sharing plans and quota trading issues.

3.4 Connecting renewable energy to the grid

Introduction

Providing for renewable energy plants to be connected to the electricity grid, and for the grid to be able to use the power supplied, is crucial. The Renewable Energy Law sets out the basic provisions: grid companies must provide grid-connection services for renewable energy plants, and must buy the renewable energy that is produced and supplied to the grid. Costs can be passed down to the energy consumers.

However, there is some more progress which can be made, particularly in relation to sharing the costs of grid connection and ensuring grids are technically and physically able to accept and use the renewable energy supplied to them.

Relevant provisions of the Renewable Energy Law

Article 14—Grid enterprises shall enter into grid connection agreement with renewable power generation enterprises that have legally obtained administrative licence or for which filing has been made, and buy the grid-connected power produced with renewable energy within the coverage of their power grid, and provide grid-connection service for the generation of power with renewable energy.

Article 16—If the gas and heat produced with biological resources conform to urban fuel gas pipeline networks and heat pipeline networks, enterprises operating gas pipeline networks and heat pipeline networks shall accept them into the networks. ... Gas-selling enterprises shall, on the basis of regulations of energy authorities of the State Council or people's government at the provincial level, include biological liquid fuel conforming to the national standard into its fuel-selling system.

Article 21—Grid connection expenses paid by grid enterprises for the purchase of renewable power and other reasonable expenses may be included into the grid enterprise power transmission cost and retrieved from the selling price.

Article 29—If the power grid enterprises breach Article 14 hereof and fail to purchase renewable power in full, which results in economic loss to the renewable power generation enterprises, such power grid enterprises shall be liable for compensation, and the national power supervisory institutions shall order them to make correction within a stipulated period of time; in case of refusal to make correction, a fine of less than the economic loss of the renewable power generation enterprises shall be imposed.

Article 30—In case that enterprises of natural gas pipeline network and heat pipeline network breach paragraph 2 of Article 16 hereof and do not permit the connection of natural gas and heat that conform to the grid connection technical standard into the network, which results in economic loss to the gas and heat production enterprises, relevant enterprises shall be liable for compensation, and energy authorities of the people's government at the provincial level shall order them to make correction within a stipulated period of time; in case of refusal to make correction, a fine of less than said economic loss shall be imposed against them.

National regulations

It is the intention of the Renewable Energy Law is that renewable energy will enjoy priority access to the electricity grid, and some regulations are already in force to assist with this. Relevant regulations include:

- Regulation on the administration of power generation from renewable energy (NDRC Price [2006] No.7); and
- Measures on Supervision and Administration of Grid Enterprises in the Purchase of Renewable Energy Power (SERC [2007] Order No.25).

The NDRC Regulation provides that utilities are obliged to allow renewable energy facilities to connect to the grid.

The SERC Order, which came into force on 1 September 2007, requires the national grid authority and national standards authority to draft grid connection and power purchase standards to ensure the safety of the grid when it receives electricity from renewable energy sources. It also governs the supervision of power grid enterprises' purchase of electricity generated by renewable sources. The SERC and local agencies are now responsible for supervising such purchases. Power distributors are required to use all available renewable electricity in their power grid, including hydro, wind, solar, biomass and geothermal power.

Furthermore, power grid enterprises and electricity distributors are held responsible for any misconduct that causes losses to producers of renewable energy. Some examples of misconduct include:

- a failure to construct necessary facilities to connect the electricity to the power grids, or failure to do so in time;
- refusal to sign electricity purchase and distribution agreements with the producers or intentionally obstructing the conclusion of those agreements;
- failure to provide services related to the connection of electricity or failure to do so in time; and
- failure to give priority to electricity from renewable energies in electricity distribution.

The penalties for such misconduct will be fines calculated by reference to the losses suffered by the renewable energy generators as a result of the misconduct.

Technical standards

There are various technical standards which apply to grid connection, including:

- Technical code for wind farms to connect to the grid;
- Technical code for geothermal power plants to connect to the grid; and
- Technical code for PV power plants to connect to the grid.

Outstanding issues

RECOMMENDATIONS FROM JUNE 2007 REPORT

- Favourable grid connection and pricing regulations for small hydropower projects, which are usually rejected by power grids, need to be developed.

In addition to specific grid connection issues for small hydro plants, there is still progress to be made in ensuring the grid can receive renewable energy. While the SERC Order (discussed above) is a welcome development, in practice the ability of the grid to receive electricity from variable sources, such as most types of renewable energy, is still a concern.

The Energy Working Group of the EU Chamber of Commerce in China notes that:

Renewable energy developers face a series of grid interconnection difficulties. These difficulties create delays, reduce profits and increase risks and uncertainty to the detriment of the development of the renewable energy sector in China. ... Grid companies often use technical reasons for not complying with their [grid connection] obligations under the Renewable Energy Law.²⁹

Looking specifically at wind power, Shi Pengfei notes that power grid issues will be the major constraint to the further development of wind power in China.³⁰ However, in 2008 there was increased investment in the power grid to help to address these issues.³¹

It may help if a new set of grid codes for renewable energy sources are developed to reflect the specific technical features of those sources, as traditional, inflexible codes are not appropriate for renewable energy. In addition, publication of a model grid connection agreement and model power purchase agreement would assist.³²

Key issues of which potential investors should be aware

Although the Renewable Energy Law has provisions on grid connection and power purchase for renewable energy projects, in practice renewable energy companies may encounter difficulties in achieving satisfactory connection to the grid and in selling all their power to the grid.

²⁹ *European Business in China Position Paper 2008-2009*, p. 178

³⁰ "Rapid development of wind power market in China", presentation by Shi Pengfei of the Chinese Wind Energy Association at the Clean Energy Council Conference, Gold Coast 24 November 2008

³¹ "China blasts through wind energy target", 15 January 2009, Environmental Finance Online News

³² *European Business in China Position Paper 2008-2009*, p. 178, published by the EU Chamber of Commerce in China

3.5 Regulatory approvals

Introduction

The uncertainty, cost and time associated with obtaining the regulatory approvals required for a renewable energy project have a considerable impact on the attractiveness of such projects to investors. If an investor/ developer must obtain approvals from different levels and departments of government, if it is not certain until a late stage whether all approvals will be obtained, if it takes some effort to complete the required forms and if it will take some time to receive responses, the investor/ developer will be less willing to proceed with a project. To a greater or lesser extent, all of these issues apply in relation to approvals for renewable energy projects in China (in common with many other countries).

In addition to approvals relating to land use, development and price setting, foreign investors will also need to go through the foreign investment approvals process.

Local knowledge is important in navigating the approvals process. The Renewable Energy Law does not set out the full approvals process, but instead refers to the administrative permits and filings required by the State Council.

Relevant provisions of the Renewable Energy Law

Article 2— Application of this Law in hydropower shall be regulated by energy authorities of the State Council and approved by the State Council.

Article 13— For the construction of renewable energy power generation projects, administrative permits shall be obtained or filing shall be made in accordance with the law and regulations of the State Council.

In the construction of renewable power generation projects, if there is more than one applicant for project license, the licensee shall be determined through a tender.

Outstanding issues

RECOMMENDATIONS FROM JUNE 2007 REPORT

- Clarify the responsibilities of each level of government in the approvals process.
- Clarify and streamline the overlap between the renewable energy approvals process and the foreign investment approvals process.

Some progress remains to be made in streamlining the approvals process for renewable energy projects, particularly for foreign investors who may not have a good understanding of the approvals process.

Key issues of which potential investors should be aware

Foreign investors will need to obtain local advice and assistance in navigating the approvals process for establishing a renewable energy project. It may take some time to obtain all required approvals.

3.6 Investment incentives

Introduction

Investment incentives are vital to the renewable energy industry, as the costs of renewable energy are still greater (in most cases) than fossil fuel power generation, particularly in the project construction phase. The Renewable Energy Law sets out various incentives for renewable energy. The most important of these is commonly the feed-in tariff, guaranteeing the renewable energy developer an above-market rate for the renewable energy it generates – see section 3.2. However, certain other incentives are also available, such as access to low-interest loans and tax benefits.

Relevant provisions of the Renewable Energy Law

Article 19—Grid power price of renewable energy power generation projects shall be determined by the price authorities of the State Council in the principle of being beneficial to the development and utilization of renewable energy and being economic and reasonable, where timely adjustment shall be made on the basis of the development of technology for the development and utilization of renewable energy. The price for grid-connected power shall be publicized.

Article 25—Financial institutions may offer preferential loan with financial interest subsidy to renewable energy development and utilization projects that are listed in the national renewable energy industrial development guidance catalogue and conform to the conditions for granting loans.

Article 26—The Government grants tax benefits to projects listed in the renewable energy industrial development guidance catalogue, and specific methods are to be prepared by the State Council.

National regulations and policies

The requirement in the Development Plan that power generators have a certain percentage of their power generation capacity in the form of renewable energy generation capacity (see section 3.1) provides an additional incentive for those companies to invest in renewable energy.

Outstanding issues

RECOMMENDATIONS FROM JUNE 2007 REPORT

- Clarify the details of financial incentive programs for solar photovoltaic power generation and biofuels, as well as the tax and loan arrangements.
- Consider international best practice for effective tax incentives, loans and funding for renewable energy projects, including tying assistance to technical standards and project lifetime output goals.
- Ensure that the process for applying for and the criteria for receiving such incentives are clear and easily available, in several languages.

Progress still remains to be made in addressing the above recommendations, particularly the third recommendation on making information on the available incentives easily available. The Energy Working Group of the EU Chamber of Commerce in China states that:

China's support mechanism for renewable energies has evolved from providing direct subsidies to the supplier to a more complicated system that also includes tax reductions and exemptions, preferential price and credit guarantees and other subsidies implemented by central and local governments.

There is no transparent and systematic policy on these incentives nor is there information to help investors understand how to benefit from these incentive policies.³³

The government may consider establishing a website and hotline with information on renewable energy incentives available in some key languages, with links to information resources of provincial governments where required.

The incentives at central and provincial levels may benefit from a review for gaps, inconsistencies and overlaps, and to ensure that the desired outcome is being promoted. For example, the incentives should prioritise the actual generation of power from renewable energy plants (operational incentives), rather than merely the establishment of renewable energy capacity (investment incentives).

Key issues of which potential investors should be aware

In addition to the feed-in tariffs, some valuable renewable energy incentives may be available to renewable energy investors under State or provincial laws, but it may be difficult for foreign investors to locate full information on these incentives. Local advice will be useful.

³³ *European Business in China Position Paper 2008-2009*, p. 178-179

3.7 Technical standards

Introduction

Technical standards are crucial to ensure components for renewable energy plants are safe and reliable, and reduce the long-term risks of renewable energy equipment. Standards need to be developed and then a system must be put in place to ensure that components meet those standards, with penalties for manufacturers, importers or retailers that provide products that do not meet the standards.

The Renewable Energy Law provides for standards to be developed, particularly for solar power:

Relevant provisions of the Renewable Energy Law

Article 11—Standardization authorities of the State Council shall set and publicize technical standard for renewable energy electric power and the technical standards for relevant renewable technology and products for which technical requirements need to be standardized at the national level.

For those technical requirements not dealt with in the national standard in the previous paragraph, relevant authorities of the State Council may establish relevant industrial standard, which shall be reported to the standardization authorities of the State Council for filing.

Article 17— Construction authorities of the State Council shall cooperate with relevant authorities of the State Council in establishing technical economic policies and technical standards with regard to the combination of solar energy utilization system and construction.

Real estate development enterprises shall, on the basis of the technical standards in the previous paragraph, provide necessary conditions for the utilization of solar energy in the design and construction of buildings.

For buildings already built, residents may, on the condition that its quality and safety is not affected, install solar energy utilization system that conform to technical standards and product standards, unless agreement has been otherwise reached between relevant parties.

National technical standards

Many standards are still under development. As noted in the June 2007 Report, two wind power generation standards have been published, as well as technical codes for wind farms, geothermal power plants and solar PV plants to connect to the electricity grid.

Several solar PV standards and codes have been or are in the process of being developed by the Solar Energy Photovoltaic Products Certification Technical Committee. Some of the more recent PV standards are:

- Photovoltaic systems - Characteristics of the utility interface (serial number GB/T20046-2006)
- Photovoltaic module safety qualification - Part 1: Requirements for construction (serial number GB/T20047.1-2006).

Solar PV standards in the process of being developed include the "Technical Specifications for PV-use Valve Control Sealed Lead-Acid Storage Batteries" and the "Implication Rules for Certification of Stand-alone Photovoltaic Systems".³⁴

The Ministry of Construction has completed the "Technical Regulations on the Application of Solar Water Heating Systems in Civil Construction" and the "Technical Regulations on the Application of Geothermal Pumping Engineering".³⁵

The Development Plan notes (in section 5(2)) that the administrative authorities under the State Council responsible for the construction industry and the Standards Administration of China will develop national standards for solar systems in buildings, and will update the relevant construction standards, engineering specifications and management regulations of urban construction to create good conditions for the development of solar systems in buildings.

Provincial technical standards

Only Yunnan and Hainan have developed standards for integrating solar power with building development.

Outstanding issues

RECOMMENDATIONS FROM JUNE 2007 REPORT

- Implement further technical standards to build China's renewable energy in light of its limited experience (e.g. standards for the bio-fuel productions to allow for larger scale application). Australian technical bodies and consultants may be able to assist with developing appropriate standards.
- Require manufacturing and consultant companies to provide warranties to government authorities that products meet technical standards, and require independent verification of estimates and designs, to put commercial pressure on companies to deliver high-quality products.
- Environmental protection regulations for large hydropower projects need to be clarified.

While some progress has been made in this area, further development and enforcement of technical standards would be useful in ensuring the efficiency and reliability of the renewable energy industry.

Although there is an authorised certification authority for the certification of renewable energy products, the China General Certification Centre, China's renewable energy testing levels are generally not recognised internationally.³⁶ This is an area for further development.

³⁴ *Report on the Development of the Photovoltaic Industry in China (2006-2007)*, China Renewable Energy Development Project, June 2008

³⁵ *China Renewable Energy Development Overview*, March 2008, Energy Bureau and Energy Research Institute of the NDRC

³⁶ *Report on the Development of the Photovoltaic Industry in China (2006-2007)*, China Renewable Energy Development Project, June 2008

The lack of technical standards for wind turbines is a serious issue. Standards should be set at the national level, based on international practices.

In relation to the third recommendation above, the White Paper on China's Energy Conditions and Policies notes, in general terms, that hydro power projects will be developed on the conditions that:

- the environment is protected; and
- problems affecting local people are properly settled (Section IV).

Further detail on these protections would assist.

Key issues of which potential investors should be aware

Technical standards for renewable energy products in China may not be the same as standards in other countries. In some cases standards have yet to be developed or are not regularly enforced. Foreign investors in renewable energy manufacturing industries may wish to consider adopting and promoting the standards used in their country of origin.

3.8 Resource data

Introduction

Electricity generation from renewable sources can be very sensitive to small changes in the renewable resource. It is important to make investment decisions based on the best available data on the availability of the selected renewable energy, whether that be wind, sunlight, water flow or available biomass fuel.

The Renewable Energy Law provides that national resource surveys should be conducted, and the results made public.

Relevant provisions of the Renewable Energy Law

Article 6 — Energy authorities of the State Council are responsible for organizing and coordinating national surveys and management of renewable energy resources, and work with related departments to establish technical regulations for resource surveys.

Relevant departments of the State Council, within their respective authorities, are responsible for related renewable energy resource surveys. The survey results will be summarized by the energy authorities in the State Council.

The result of the survey of renewable energy shall be released to the public, with the exception of confidential contents as stipulated by the Government.

Article 24 — The Government budget establishes renewable energy development fund to support the following:

- (1) Scientific and technological research, standard establishment and pilot project for the development and utilization of renewable energy;
- (2) Construction of renewable energy projects for domestic use in rural and pasturing areas;
- (3) Construction of independent renewable power systems in remote areas and islands;
- (4) Surveys, assessments of renewable energy resources, and the construction of relevant information systems;
- (5) Localized production of the equipment for the development and utilization of renewable energy.

Current status of resource assessments

The Development Plan goes some way towards the resource assessment goals set out in the Renewable Energy Law by noting the potential resources of hydropower, biomass energy, wind energy, solar energy and geothermal energy. However, this information is not detailed.

The White Paper on China's Energy Conditions and Policies notes that the Government has earmarked special funds for a renewable energy resource survey (Section IV). The NDRC has completed an assessment of China's hydro power resources, including estimates of the remaining hydro power resources. In 2008 the NDRC conducted a national wind energy resource investigation, wind site assessment and biomass energy resource assessment.³⁷ As of January 2009, the results of this assessment were not publicly available in English.

³⁷ *China Renewable Energy Development Overview*, March 2008, Energy Bureau and Energy Research Institute of the NDRC

Outstanding issues

RECOMMENDATION FROM JUNE 2007 REPORT

- Implement a national approach to resource assessment such as wind mapping. Conduct training in resource assessment and make methods and results available to developers.

While the Government has undertaken some resource surveys, it would assist if detailed results were made more widely available and if resource assessment methods were disclosed. To be most helpful, assessments should take into account not just the physical resource, but also factors such as terrain, traffic, proximity to grid, proximity to sources of demand for energy, infrastructure and social conditions.³⁸

Key issues of which potential investors should be aware

Not all publicly-available renewable energy resource assessments are complete and up-to-date. Investors may need to conduct some level of resource assessment themselves before committing to renewable energy projects, in order to obtain recent, detailed data on the resources at their proposed sites.

³⁸ “Rapid development of wind power market in China”, presentation by Shi Pengfei of the Chinese Wind Energy Association at the Clean Energy Council Conference, Gold Coast 24 November 2008

4. Wind power – key issues

4.1 Wind power capacity

While there has already been significant development of wind power in China, there remains substantial potential for further wind power projects in several provinces. However, not all of this resource potential is ideally located with respect to load centres and grid infrastructure. The table below sets out some estimates of installed capacity and potential wind power capacity in various provinces. (Note that installed capacity is expressed in megawatts and potential capacity is expressed in gigawatts.)

POTENTIAL AND INSTALLED WIND POWER CAPACITY IN PROVINCES

PROVINCE	POTENTIAL (IN GW)	INSTALLED (IN MW)
Beijing Municipality	N/a	49.5
Tianjin Municipality	N/a	1.5
Hebei Province	77.9	491.45
Shanxi Province	49.3	5
Inner Mongolia Aut. Region	786.9	1563.19
Liaoning Province	77.2	507.81
Jilin Province	81.2	612.26
Heilongjiang Province	219.5	405.25
Shanghai Municipality	N/a	28.9
Jiangsu Province	30.3	293.75
Zhejiang Province	20.8	47.35
Fujian Province	17.5	237.75
Shandong Province	50.1	350.2
Henan Province	46.8	3
Hubei Province	24.6	13.6
Hunan Province	31.4	1.65
Guangdong Province	24.8	287.39
Hainan Province	8.2	8.7
Gansu Province	145.6	338.3
Ningxia Aut. Region	18.9	343.2
Xinjiang Aut. Region	437.3	299.31
Hong Kong	N/a	0.8
Source: CREIA	Total	3236

4.2 Recent developments and major projects

Wind power capacity in China increased by 127% from 2007 to 2008. By the end of 2008, installed wind power capacity reached approximately 12.8 GW, according to a report by the China Electricity Council.

The wind power industry in China is dominated by five big State-owned electric power companies, which are required to have a certain percentage of renewable energy in their portfolios (see section 3.1).

Case studies

- One of the most important wind farm development areas is Inner Mongolia, which generates approximately 40% of the national total wind power. Installed wind power reached approximately 1563 W at the end of 2007 and is estimated to reach 30 to 40 GW by 2020. Several gigawatt-size wind farms have been identified in the region.
- The area with the second largest wind power potential is the three North-east provinces. The total wind turbine installation amounts to 1524 MW with expected installation to reach 10 to 15 GW by 2020. Three gigawatt-size wind farms have been identified in the region.
- The third largest potential wind power area is in Gansu. Current power generation is approximately 145 GW. Total wind power installation is 338 MW. The provincial government is attempting to develop a 20 GW wind farm by 2020. A 5 GW project has been approved and a 3.6 GW project has passed the bidding tender process.
- The region with the fourth-highest wind potential is Jiang. The Government has indicated that it wishes to build a 20 GW wind farm there by 2020. To date, approximately 294 MW of wind power has been installed.

4.3 Tariffs for wind power

Wind power prices are intended to be set by the government in the form of a feed-in tariff, as noted in section 3.2. In principle, this regulation should apply to all the projects. However, there is a vast difference in wind resources and individual projects across China. In practice, the regulation is only applied to national concession (tender) projects. After the release of the NDRC Price Measure, several price establishing methods, pertaining to non-concession projects, were approved.

1. *Non-concession projects following the concession prices:* Individual projects that have not been developed as national concession projects but which present similar resource conditions and terrain may apply for the development right and authorisation by the NDRC under the concession program by promising to accept the price already determined under a national concession project. Examples of projects where this has occurred include projects in Jiangsu, Inner Mongolia, Jilin and Gansu provinces. In Jiangsu Province, a series of projects have been approved by this method. Developers accepted the online reference price level established by concession projects and projects were subsequently approved by local government authorities.
2. *Local tender:* The local tender price level is generally higher than the national tender price, estimated to be 5-10 cents more per kWh. Local tendering is generally organized by the Provincial Development and Reform Committee or county government organizations, and is for projects up to 50 megawatts only. Examples of provinces which have established a wind power tariff through tendering include Fujian, Inner Mongolia and Shandong and Hebei provinces.
3. *Price approved by the local government:* Pricing at a local level can often be influenced by lobbying the appropriate government departments in charge of project and pricing approval. For example in Jilin and Inner Mongolia some project tariffs were approved by the local government despite there being a national concession tender price that could act as a reference. Other projects were approved by the central government. In Liaoning, Shandong, Heilongjiang and Fujian Provinces local governments also adopted tendering as a pricing method for projects, without using a standardised reference tender price.
4. *Set tariff in Guangdong:* In Guangdong province, a unified "Feed-in tariff" is available for wind power projects. All projects, including those that are not national wind power concession projects, are able to access the feed in tariff. In March 2008 the tariff was raised to 0.68 Yuan per kWh. No other province has a specifically identified tariff.

National concession projects are large projects awarded by tender, for which the Central Government often gives favourable terms. The national concession price is, theoretically, only applicable to these tendered projects, but due to tariff alignments the national concession price may also affect other wind power projects close to the national concession projects. Other types of renewable projects however are unlikely to be affected by national concession projects policies.

Usually, project owners submit project documents, which include suggested tariffs, to the provincial department in charge of energy (generally the transportation and energy division of the provincial development and reform committee). The government departments in charge of approving pricing are the Pricing Department of the NDRC and the provincial Bureau of Commodity Prices. The difference between the preliminary opinion of the Bureau of Commodity Prices and the final approved tariff is normally determined by discussion. When approving a power project, the NDRC and the local Bureau of Commodity Prices normally recommend a tariff. When the project construction is completed the tariff takes into account the actual construction cost.

The wind power pricing system is very complicated. However, in summary there are two channels to establish the wind power price:

- Bidding price – there are currently 4 phases of bidding with a total of 2400 MW generated by approximately 15 projects. These projects are national wind concession projects and are priced from 0.38 Yuan/kWh to about 0.519 Yuan/kWh. The average price of bidding projects calculated at the end of 2007 is 0.471 Yuan/kWh with 8.5% of valued added tax (VAT) by end of 2007.
- Prices adopted by local price bureaus at the provincial level. The price is mainly based on the wind resource with some reference to the bidding project price. The price ranges from 0.42 Yuan/kWh to 0.78 Yuan/kWh with an average price of approximately 0.59 Yuan/kWh.

The wind price includes 8.5% of VAT. Local approval prices are generally higher than the prices under the National Bidding program, with an average difference of 0.12 Yuan/kWh.

The highest price paid is for a project located in Shandong, which pays approximately 0.681 Yuan/kWh. The lowest price paid is a project located in Jiangsu where all the prices come through the bidding channel. The current wind power prices in various provinces of China are shown in the tables in Appendix 3.

In 2007 and 2008, the Pricing Division of the NDRC approved prices for more than 60 wind power projects, in more than 10 provinces/ cities, taking into account the renewable energy resources of the area and the construction costs. Prices differ between regions, but are generally consistent for projects within the same region. Tariffs fixed by the NDRC in this way tend to be higher than prices established under tender for concession projects, but are still lower than wind power prices in other countries.

The table below compares prices set by tender for concession projects to the prices set by the NDRC for wind power in different areas.

PRICES FOR WIND POWER PROJECTS – CONCESSION AND FIXED

REGION	CONCESSION TARIFF	TARIFF FIXED BY NDRC	
Inner Mongolia	0.382-0.5216	West 0.51	East 0.54
Hebei	0.5006-0.5510	North 0.54	South 0.61
Jilin, Shandong, Liaoning, Heilongjiang, Henan, Shanxi and Hubei	0.509-0.52	0.61	
Gansu	0.4616-0.5206	0.54	
Ningxia	NA	0.56	
Xinjiang	NA	0.51	
Fujian	NA	0.585	
Jiangsu	0.4365-0.4877	NA	
Guangdong	0.5013	0.68 (set by local government)	

Source: based on the website of NDRC. Tariffs include VAT.

At a provincial level, pricing has also become increasingly standardised for projects within the province, by way of a unified tariff. Uniform prices set by individual provinces have been used as a standard and are expected to indicate price trends in approved wind projects.

In addition, trends in awarding tenders indicate the highest and lowest bids will be deleted and the bid closest to the median will determine the final concession price.

When a tariff is applied to either a national concession project or a non-concession project, it is applied for 30,000 hours. This is only applicable for wind projects.

To date, most foreign investors have adopted a joint venture model with domestic partners for wind power development. However, the approved tariff is not affected by whether the development is owned by domestic or foreign investors.

4.4 Other issues

Key issues of which potential investors should be aware

Some general information is available on wind resources in China. Jiangsu, Inner Mongolia, Jilin and Gansu provinces are the most important wind farm development areas. However, other provinces including Xijiang, which is the second largest wind resource region in China, Fujian and Guangdong are also attractive wind development areas. However, there is an urgent need to develop detailed wind resource assessments, incorporating consideration of factors such as terrain, traffic, proximity to grid, proximity to sources of demand for energy, infrastructure and social conditions.³⁹

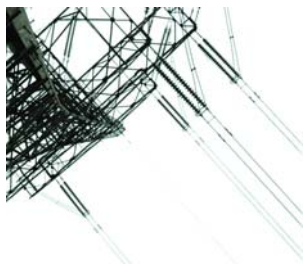
Availability of land near major sources of demand is increasingly an issue. In Inner Mongolia, Gansu and Xinjiang, there are good wind resources and available land, but not much demand. The efficient transmission of wind power to centres of demand is crucial, and improvements may be required to the grid infrastructure to achieve this. Power grid issues will be the major constraint.⁴⁰

The goals in the Development Plan are to increase wind turbine installation to 10 GW by 2010 (already achieved) and 30 GW by 2020. However, it is likely that the total installation will be greater than these amounts, and it may reach 25 GW by 2010 and 100 to 150 GW by 2020. Revised targets may be announced soon.

Recent rapid growth in the wind power sector has been associated with turbine unreliability and underperforming wind power projects. The industry is starting to address this by doing further testing.

³⁹ “Rapid development of wind power market in China”, presentation by Shi Pengfei of the Chinese Wind Energy Association at the Clean Energy Council Conference, Gold Coast 24 November 2008

⁴⁰ “Rapid development of wind power market in China”, presentation by Shi Pengfei of the Chinese Wind Energy Association at the Clean Energy Council Conference, Gold Coast 24 November 2008



5. Undertaking a project in China – broader issues

5.1 Corporate structuring

Possible investment structures

Foreign investors keen to enter the renewable energy market in China may, under current Chinese laws and regulations, only do so under a joint venture (*JV*) arrangement in China and not as a wholly foreign owned enterprise (except in certain encouraged industries), or under an arrangement which combines both structures. Determining which *JV* investment structure will be adopted and being alert to the advantages and disadvantages of each will be essential to effectively manage business and legal risk.

China has a number of national laws relevant to *JV* foreign investment and the renewable energy industry. The types of corporate structure available to foreign investors in China are:

- Representative office;
- Equity joint venture (*EJV*);
- Contractual joint venture (*CJV*); and
- Wholly foreign-owned enterprise (*WFOE*).

JV structure – distributing profit

The different features and requirements that apply to *EJVs* and *CJVs* are significant for investors seeking to undertake renewable energy projects in China. *CJVs* may provide a flexible structure via which investors might make their contributions to registered capital, manage the *JV*, and distribute its profits. By contrast, *EJVs* are typically viewed as less flexible than *CJVs*. For instance, management control and profit distribution are typically proportionate to each party's respective contribution to the *EJV*'s total registered capital.

For both *CJVs* and *EJVs*, however, central government regulations may influence and/or determine significant factors, such as the amounts of the parties' capital contributions to the *JV*, the types of foreign investors that are permitted to invest in certain types of projects, and the type of *JV* structure which might be used for foreign investment in certain sectors. For instance, in *CDM* projects, the percentage of foreign shareholding is restricted and, currently, only *EJV* structures can be used.

JV structure – managing joint ventures

Foreign parties should be aware of certain management issues associated with a *JV* structure. For example, under relevant laws and regulations in China, changes to the *JV*'s amount of registered capital, as well as changes to the articles of association and *JV* Contract, may be made only with unanimous consent of the *JV*'s board of directors.

These requirements might pose a problem in a situation where, for example, one investor wishes to add capital to the JV and the other partner does not.

An advantage of a CJV is that, subject to approval by the relevant government authorities, it may be possible for the foreign investor to achieve early recoupment of the capital that it has invested. In an EJV, on the other hand, investors usually cannot recover their capital, except in certain circumstances, which might include liquidation of the JV, transfer of their equity interest in the registered capital of the JV, which would require government approval and is subject to the other JV partners' pre-emptive rights, or reduction of the JV's registered capital, which is subject to approval by the relevant government authorities (such approval is often difficult to obtain).

WFOE structure

Foreign investment in the construction and operation of power stations using new sources of energy (including solar energy, wind energy, magnetic energy, geothermal energy, tidal energy, biomass energy and so on) is encouraged by China's foreign investment policies, and the establishment of WFOEs in such industries is permitted.

A WFOE can be a limited liability company or, upon approval by the relevant Chinese government authorities, may take another form. Currently, most WFOEs in China are established by a single foreign investor, although the relevant regulations allow two or more foreign investors to apply jointly to establish a WFOE.

Foreign investors often prefer WFOEs, since, unlike for an EJV or a CJV, there is no requirement for the investor to partner with a Chinese party. Thus, the WFOE provides foreign investors with the opportunity to completely control and manage the daily operations of the entity.

Acquire shares or assets?

A JV could result from a foreign investor buying into an existing domestic Chinese enterprise by acquiring an equity interest in the registered capital of that enterprise. Alternatively, the foreign investor and the investors in the Chinese enterprise could agree to jointly establish a new EJV or CJV.

If the parties opt for a buy-in by the foreign investor, the equity acquisition should be structured to address hidden liabilities. Such hidden liabilities might include the tax liabilities arising from the enterprise's operation prior to the buy-in, and the feasibility of the effective assignment of all business contracts, government permits and concessions.

Regardless of whether a foreign investor opts to establish a new enterprise in China or to acquire interests in or assets of an existing enterprise in China, it will be subject to approval by the relevant Chinese government authorities and to applicable requirements under relevant laws and regulations in China concerning limits on foreign investor shareholding, permissible shareholding structures, required registered capital amounts, and anti-trust filing requirements. In addition, it will be important for the foreign investor to know if the transaction involves any state-owned assets, since the sale of state-owned assets is subject to a special regulatory regime in China.

Taxation

For JVs and WFOEs (collectively, foreign investment enterprises or *FIEs*) that were approved and established before 16 March 2007, the following tax principles apply:

An FIE is subject to 30% national income tax rate, plus a 3% local income tax rate. Manufacturing FIEs with a term of 10 years or more are eligible for a 100% tax exemption for the initial two profit-making years and a 50% reduction during the subsequent three years. Longer tax holidays are available to export-oriented enterprises and technologically advanced enterprises. Even more preferential tax incentives are available in certain development zones and for special industries.

No withholding tax is levied on dividends remitted to the foreign investor outside of China. A 10% withholding tax applies to royalties, rental and interest income. FIEs are also subject to other taxes, including value added tax, business tax, real estate tax, land value added tax, customs duties, stamp tax and vehicle and vessel license tax. Whether a particular FIE will be subject to all or some of these taxes depends on the nature of its activities.

Foreign exchange controls

There are limits on the amount of foreign exchange that an FIE may borrow. These limits will vary and will depend primarily on the particular financial, total investment, and registered capital circumstances of the FIE.

FIEs are subject to “debt-equity” ratio requirements which regulate the percentage of registered capital which must be paid in by the investors in WFOEs and JVs. For example, where the total investment for an FIE is more than US\$3 million but less than or equal to US\$10 million, at least 50% of the total investment must be in the form of registered capital (which must be paid in to the FIE by its investors).

Investors’ capital contributions to FIEs can take the form of cash, machinery, equipment, industrial property, proprietary technology or, upon approval, Renminbi profits derived from their other investments in China. It will be important to ensure that the non-cash contributions are appropriately valued.

One of the reasons many investors consider utilizing a CJV instead of an EJV is that the investors are able to make their contributions to the JV in forms other than those typically allowed for an EJV. For example, the Chinese party to a CJV might, as part of its contribution to the registered capital of the CJV, locate and pay for the local labour required by the CJV.

Debt financing restrictions for foreign companies

Currently, foreign companies are limited to a maximum of 66% debt financing of the capital cost of a project (compared to domestic projects which are permitted 80% debt financing), a restriction which automatically results in a lower return on investment for foreign companies over the life of the project. It has been reported that lower than anticipated leveraged rates of return for development, construction and operation of projects is adversely affecting foreign investment in new renewable energy facilities.

5.2 Project approvals

In China, different categories of projects (encouraged, permitted, restricted or prohibited) are subject to different government approval requirements. The table below summarises these requirements.

FOREIGN INVESTMENT CATEGORIES AND APPROVAL REQUIREMENTS

FOREIGN INVESTMENT CATEGORIES		TOTAL INVESTMENT (INCL. ANY CAPITAL INCREASE)	VERIFICATION AND APPROVAL AUTHORITY
1	Encouraged or permitted	US\$500 million or above	State Council
	Restricted	US\$100 million or above	
2	Encouraged or permitted	US\$100 million – US\$500 million	NDRC and Ministry of Commerce at the central level
	Restricted	US\$50 million – US\$100 million	
3	Other foreign investment projects		Local counterparts of NDRC and Ministry of Commerce

The effect of these categorisations is to streamline the approval requirements for, and thereby encourage, those projects that are seen as high priority projects for Chinese development (in encouraged, and to a lesser extent, permitted categories). Renewable energy projects can benefit from these distinctions, since for the most part such projects are encouraged and therefore subject to less stringent requirements.

The category of ‘encouraged’ projects includes the following project types:

- Construction and operation of power stations using technology for clean burning of coal;
- Construction and operation of thermo-electric cogeneration power stations;
- Construction and operation of hydroelectric power stations; and
- Construction and operation of power stations using new sources of energy (including solar energy, wind energy, magnetic energy, geothermal energy, tidal energy, biomass energy etc).

5.3 Clean Development Mechanism (CDM)

Introduction

The CDM is intended to be, among other things, a vehicle for investment and technology transfer between developed countries and developing countries including China. However, the international rules concerning the CDM as well as China's domestic CDM legislation have resulted in some barriers which must be overcome if the CDM is to be a meaningful driver for significant market growth in the renewable energy sector. Renewable energy investors in China seeking to develop renewables projects under the CDM should also be aware of some practical issues and difficulties that should be considered early in the project cycle, as well as some specific corporate structuring requirements for CDM projects in China.

International CDM rules

Additionality is a key eligibility criterion, and must be proved using the “additionality tool” provided by CDM Executive Board. Chinese policies encouraging renewable energy (e.g. the Renewable Energy Law) are not to be taken into account when assessing baseline (type E- under CDM rules). This benefits developers in China because it is easier to meet the requirement of additionality. Developers should consider additionality early and document the decision-making process to enable them to substantiate additionality arguments later.

However, Chinese policies and regulations encouraging renewable energy are not to be taken into account when calculating the baseline scenario (this is known as ‘Type E-additionality’). The baseline is calculated as the hypothetical scenario without the regulations being implemented. This benefits developers in China because it is easier to meet the requirement of this additionality.

Developers should consider additionality early and document the decision-making process to enable them to substantiate additionality arguments later.

Host Countries (i.e. the Chinese Designated National Authority) must issue approvals of potential CDM projects confirming their contribution to the country's “sustainable development”. Entities wishing to receive certified emissions reductions (*CERs*) directly must also obtain authorisation from a developed country that is party to the Kyoto Protocol.

Chinese CDM rules

CDM regulations in China impose a number of specific requirements on renewable energy projects conducted as CDM projects.

Corporate structuring

In relation to corporate structuring, the Chinese CDM rules impose restrictions on the involvement of foreign companies in Chinese projects. Specifically, the rules state that only enterprises in China which are wholly Chinese-owned or those in which the

Chinese party or parties hold a controlling interest (i.e. at least a 51% stake) may undertake CDM projects with foreign parties. This is understood to mean that the Project Entity must be a Chinese individual or entity or controlled by a Chinese individual or entity.

It has been reported that this restriction is resulting in a number of projects not being developed, as many investors are unwilling to cede control of a project to an unknown or inexperienced domestic partner. This is particularly the case for large projects which need strong operational skills and experience to ensure profitability.⁴¹

The CDM rules also impose restrictions on the form of joint ventures that can be used for CDM projects in China. Currently, only equity joint ventures will be approved by Chinese Government authorities; cooperative joint ventures cannot be used at this time.

Terms of emissions reduction purchase agreement (ERPA)

In addition, the Chinese CDM rules provide that Chinese government authorities, principally the NDRC, must review and approve the terms on which CERs are sold and the contents of the CER sale agreement. This review includes approval of the specific buyer and the specific price at which CERs are sold under the ERPA or other CER sales agreement.

In its implementation of the CDM Measures, the Chinese government has effectively set a “minimum floor price” for the sale of CERs in China, which is currently €8.00. The Chinese Government has stated that in conducting its mandatory review of the terms of CER sale agreements, it will not approve CDM projects with a CER price lower than these floor price amounts. Moreover, since the NDRC generally takes the unit price agreed under an ERPA as the minimum unit price to be paid by a buyer of CERs generating by the project covered by that ERPA, the Government may not be willing to approve ERPAs which contain provisions where under an agreed unit price could be reduced.

While these provisions appear to limit the ability of CDM project participants to determine prices, in practice the Chinese Government has allowed some flexibility where justified by the particular contractual arrangements. For example, where the buyer’s contribution to the CDM project is comprised both of payments for CERs and technology or consulting services, the Government may approve a purchase price that is lower than the established floor price.

Preferential tax treatment

Finally, the Chinese CDM rules also provide for preferential tax treatment for renewable energy projects. The tax on renewable energy projects is just 2% of total CER benefits, while revenues from HFC-23 (industrial gas) projects, which have a lower sustainable development benefit, are taxed at 65%. The funds collected from these taxes are contributed to a fund used to finance sustainable development in China.

⁴¹ O’Flynn, B “A Study on the Pricing Policy of Wind Power in China: Airtricity Comments and Perspectives”

Renewable energy and the CDM – what are the issues?

Despite the favourable tax treatment of renewable energy-derived CER revenues in China and the ever-expanding opportunities for carbon financing, renewable energy projects still face some unique hurdles that should be considered by project proponents.

Lower emissions reduction potential of renewable energy projects

Firstly, due to the differentiated global warming potentials of greenhouse gases (carbon dioxide, which is displaced by renewable energy, being the least “potent” in terms of its global warming effect), the volume of emission reductions from renewable energy projects is much smaller per unit of output than the volumes created by projects which abate other greenhouse gases such as nitrous oxide, HFC or methane. Conversely, the equipment cost of most renewable energy projects is significantly higher per emission reduction than the cost of other types of potential CDM projects, such as agricultural methane flaring projects. The overall contribution of the revenue stream from CERs is therefore comparatively smaller for renewable energy projects than for other types of potential CDM projects.

As the CDM is essentially a market, CDM project equity investors will tend to go to where “manufacturing costs” are cheapest, and purchasers will tend to seek out a plentiful supply of CERs for minimum transaction costs. Renewable energy projects are therefore at a comparative disadvantage in the CDM compared to projects which reduce other types of greenhouse gases.

Long lifespan of renewable energy plant / short commitment period

In addition, renewable energy projects such as wind farms have a long operation life, which (for projects being constructed today) will extend far beyond the Kyoto Protocol’s first commitment period. There is uncertainty as to whether the Kyoto Protocol will be continued beyond the end of its first commitment period (i.e. 2012). CER purchasers have therefore been reluctant to make binding commitments to purchase CERs post-2012, such that the financial incentive created by CERs has in many cases been insufficient to support renewable energy projects for their entire operational life.

Effect of these issues on renewable energy projects

As a result of the issues discussed above, many renewable energy projects which may be eligible under the CDM have had difficulty attracting project finance to support the projects. CER purchasers have tended to restrict their involvement in CDM projects to a commitment to pay for CERs upon delivery, rather than provide financial support for the underlying project. Registration as a CDM project does not necessarily mean that a renewable energy project will achieve project finance and become operational. Issues such as perceived regulatory and political risk in developing countries and the higher level of technology risk involved in renewable energy projects (as opposed, for example, to traditional fossil fuel projects) have meant that those renewable energy projects which have achieved external finance have tended to be smaller scale projects, rather than projects to create the optimum number of CERs.

Therefore, the transaction costs of developing projects as CDM projects (including the costs of external auditors, registration fees, consultants' fees and legal fees for the negotiation of CER purchase agreements and power purchase agreements) may be prohibitively high compared to the volume of CERs expected to be generated by the projects.

Some local host country regulations (such as grid connection, distribution or electricity tariff arrangements) may not provide renewable energy projects with the priority or support needed to make them feasible in the existing electricity market. In China, however, additional policy support for renewables provides unique double financing opportunities and other avenues of financial support.

How these issues are being addressed

A number of important steps have already been taken which should mitigate some of these barriers.

Taxation measures

One of the most innovative steps is China's differential tax treatment of renewable energy projects as compared to other projects that are less beneficial for sustainable development – a system that is the first of its kind in domestic CDM regulation worldwide.

Bundling CDM projects

The international CDM rules now explicitly allow the “bundling” of large-scale projects (not just small-scale projects) to further reduce transaction costs. This additional flexibility in the CDM rules should reduce transaction costs for renewable energy projects.

Programmatic CDM

Programmatic CDM projects have the potential to assist in overcoming some of the barriers to renewable energy projects carried out under the CDM. Although local, national or regional policies and standards cannot be registered as CDM projects, small greenhouse gas reduction activities carried out under a formal program of activities can be collectively registered as a single CDM project activity. This facility is known as “programmatic CDM”.

Programmatic CDM involves the aggregation of a number of small greenhouse gas reduction activities into a larger program, which is then submitted to the CDM Executive Board as a single activity (using one baseline and monitoring methodology). The facility is designed to overcome the cost barriers identified above, which are particularly prohibitive for small renewable energy projects, and which might otherwise prevent small projects from being implemented.

Small renewable energy projects which are implemented as part of a "program of activities" (e.g. the installation of solar lighting in a community or the financing of a

number or biomass plants in rural areas) can now be eligible under the CDM as a single project.

As another example, the costs of a CDM project involving the conversion of a small number of vehicles to biofuels would only generate a small number of CERs, and so would not be economically viable even with the generation of additional carbon revenue. If, however, the project could be expanded to involve the conversion of multiple fleets of public transport vehicles, the number of CERs generated may be sufficient to offset the costs of the project and enable it to be implemented.

5.4 Protecting intellectual property

Introduction

A major concern for many companies entering China is ensuring adequate protection of intellectual property (*IP*). In fact, it is a common misconception that there is no IP law in China. However, China introduced its first IP laws in the mid-1980s and has since updated them in conformity with its international obligations under the World Trade Organisation (to which it acceded in 1994) and the Madrid Protocol (to which it became a party in 1995). China has comprehensive legislation in place dealing with trademarks, copyright and patents, with the latter covering design patents (often called industrial designs), invention patents and utility patents. Despite the promising content of the black-letter law, enforcement difficulties remain the principal issue for IP owners.

Obtaining protection: trademarks

Trademarks are primarily governed by the *Trademark Law of the PRC*, as amended in 2001. The responsible government agency is the China Trademark Office. Registration of trademarks is vital since China adopts a “first-to-file” system. This means that the person who gets their trademark application in first is entitled to register it. In comparison, the person who uses a trademark first is entitled to register in Australia.

A mark is *prima facie* registrable in China if it is a visually perceptible sign capable of distinguishing the goods of one natural person, legal person or other organisation from those of another. In order to file a trademark application, a Chinese government-approved trademark agency must act on your behalf and can only do so with a signed power of attorney. Furthermore, the applicant must provide its name and address in Chinese. It typically takes up to two years to obtain a trademark registration in China, with protection generally effective on the date of registration, rather than retroactive to the filing date (as is the case in Australia and many other countries). Once registered, protection is afforded for ten years and can be renewed for successive ten year periods.

Registration confers upon the owner the exclusive right to use and exploit a trademark in relation to the goods or services in respect of which use of the mark is approved. The law permits trademark owners to licence others to use the mark or to transfer ownership of the mark. Where a licensing arrangement is entered into, it is important to remember that the owner of a trademark is responsible for the quality of the goods on which the mark appears.

Obtaining protection: patents

The main legislation dealing with patents is the *Patent Law of the PRC*. Local patent administrative offices are responsible for processing patent applications and enforcing patents, while the State Intellectual Property Office issues all final approvals. Patents are granted on a “first-to-file” basis rather than a “first-to-invent” basis.

There are three types of patents in China:

- *design patents* are used to register a new design of a shape or pattern;
- *invention patents* are used to register new technical solutions for a product or process; and
- *utility patents* are used to register new technical solutions related to shape or structure.

Invention patents are likely to be most relevant in a renewable energy context. For eligibility, these patents require novelty, inventiveness and practical applicability.

As is the case with trademark applications, patents can only be obtained via a state-approved patent agent. Although only a preliminary examination by the patent administrative office is required for design and utility patents, a supplementary substantive examination is conducted for invention patents. Patent registration can be obtained for design and utility patents within as little as twelve to eighteen months and is valid for ten years. It can take up to three years for registration of invention patents, which remain valid for twenty years. Notably, protection is afforded from the application filing date, provided that annual maintenance fees are paid.

A patent owner has the exclusive right to make, use, offer for sale, sell or import the patented product or process. Patents and the right to apply for a patent are assignable. A licence is required for third party use of a Chinese registered patent in China and must be registered with the State Intellectual Property Office.

If registration is not obtained, control over overseas patents in China must be exercised through contractual provisions. Registration is highly recommended, however, since contractual provisions do not provide the same degree of protection or possible remedies.

Obtaining protection: copyright

The *Copyright Law of the PRC* governs copyright protection in China and the responsible government agency is the National Copyright Association. Works attracting copyright protection include written works, oral works, graphic works such as drawing of engineering designs and product designs, schematic drawings, model works, and computer software.

Registration is not required for copyright protection, although it may be desirable for enforcement purposes. Copyright automatically vests in works of Chinese citizens, legal persons and other organisations. Since China is party to the Berne Convention, works originating in Australia (which is also a party) are given at least the same level of protection in China as that given to works created by Chinese citizens.

Copyright is generally owned by the author of a work. However, where the creation of a work is sponsored by, represents the will of, and is the responsibility of a legal person or other organisation, that legal person or other organisation is deemed to be the author. A citizen's rights in respect of his or her work – which include publication, reproduction, distribution and sale – are protected for the life of the author plus fifty

years. Works of legal persons or other organisations are protected for fifty years from first publication.

Copyright is capable of being assigned or licensed. It is not a legal requirement that licences be registered, although it is often considered prudent to do so.

Enforcement issues

IP enforcement remains an issue in China despite improvements in the legal regime. In particular, there may be concerns about the adequacy of remedies, the ability and willingness of the relevant authorities to control ongoing infringements and local protectionism. The Chinese Government at higher levels widely and openly recognises the problems associated with local protectionism. Its occurrence is nonetheless often reported and is facilitated in part by the fact that most administrative enforcement authorities are funded by local governments rather than national authorities.

In China, IP rights can be enforced through administrative agencies, through the civil courts or via criminal action. Administrative enforcement procedures tend to be most effective for prompt and inexpensive action against small infringers. However, there is normally not financial compensation for losses and fines are generally very low, meaning that deterrence is not always achieved.

Civil litigation, on the other hand, is a useful method to take action against large, well-organised infringers. Possible remedies include compensation and an injunction. The court system's handling of IP disputes has improved dramatically, although there continue to be problems with inconsistency and the lack of judicial training in technical issues. Foreign plaintiffs also encounter difficulties and high costs in fulfilling procedural requirements imposed by the courts (e.g. translation of all foreign-sourced evidence). There have also been complaints about the lack of discovery and other valuable means for gathering evidence.

Criminal action may be taken by requesting the police to investigate. Counterfeiting a patent and infringing business secrets are crimes punishable by up to seven years' imprisonment. Again, however, there may be issues with bias and lack of training in the judiciary.

Techniques to maximise protection

IP rights are generally territorial, meaning that registration of a trademark or patent in, say, Australia, does not automatically result in protection in China. It is important to note that China, Hong Kong, Macau and Taiwan are separate jurisdictions for the purpose of IP protection and therefore have separate systems of registration. Here we focus on China's system.

For maximum protection, trademark and patent applications should be filed as early as possible, and preferably well before entering the Chinese market. Although it is not legally necessary, trademark owners should register and actively use a Chinese-language counterpart for English language trademarks since Chinese consumers tend to refer to the Chinese versions of foreign brands.

Regular due diligence is required to ensure that registrations are in place for all relevant pieces of IP and have not lapsed. Rather than solely relying on the authorities to deal with potential infringements, IP owners should actively monitor their rights. IP owners are normally advised to send a strong message from the start by taking “zero-tolerance” approach to IP infringements.

The theft of trade secrets – including both patented and non-patented technology and other valuable business information – is of particular concern where a foreign company has established a joint venture or licensing relationship with a Chinese partner. Business partners and employees should be selected carefully and practical steps may be taken to maintain confidentiality. Such steps could include teaching employees about IP rights and utilising physical security measures. It is particularly important to ensure that contracts with business partners and employees are stringently drafted in order to deter theft of IP and to ensure maximum protection under local law.

China is making concerted efforts to address IP enforcement issues through raising public awareness, establishing the necessary institutions, educating personnel and imposing harsher penalties. The attitude at the top levels of the Chinese Government is encouraging, with a definite realisation that stringent protection of IP rights is vital to encourage foreign investor confidence. Nonetheless, the full implementation of China’s relatively comprehensive IP laws will require a great deal of effort and expenditure.

5.5 Project planning and implementation

Introduction

Practical issues associated with the implementation of a project can be the difference between a viable project and an unprofitable one. The availability of the necessary renewable resources, a site for the project with appropriate land tenure, obtaining necessary project approvals and having arrangements in place to ensure the project outputs can be sold at the right price, are all essential factors in any renewable energy project. Having partners with local knowledge in China and in investing in existing project proposals implemented at a local level can help. Ultimately, as is the case for projects undertaken in jurisdictions outside of China, sheer commercial will, good local advice, and early planning, can help to ensure that projects in China overcome the practical and regulatory issues arising when implementing a project.

Land use rights

In China, there are two types of land ownership – state ownership and collective ownership. Historically, there has been no “private” land ownership in China. State land ownership means the relevant land is owned by the Chinese Government, while collective land ownership means the relevant land is under the control of a local “rural collective of peasants”. Basically, land in urban areas is under state ownership, whereas land in rural and sub-urban areas is under collective ownership. The Chinese Government may acquire and convert collective land in rural and sub-urban areas into state land pursuant to a statutory “land requisition procedure”.

Commercially speaking, “land use rights” rather than “land ownership” is the relevant legal concept. China’s land laws and regulations permit the Chinese government (acting through its local land bureaus) and other land owners to transact “use rights” in their land. Generally, there are four different types of land use rights in China, namely:

- granted land use rights;
- leased land use rights;
- allocated land use rights; and
- collective land use rights.

Granted land use rights are freely transferable – they have a limited duration and require payment of a fee which is normally paid in one lump sum prior to any transfer of the land use rights. Allocated land use rights are not transferable, and may be taken back by the Chinese government without compensation.

Once the type of land use right is known, investors can determine how best to structure the legal arrangements for the planned project.

For construction, the land administration department reviews a feasibility study and issues a pre-certification report. If acceptable, rights to use the land are issued and a land use rights contract is entered into, usually by and between the enterprise controlling the project and the relevant land administration bureau.

A new Property Rights Law was approved in 2007, which strengthens legal protections for privately owned land. This law creates a registration system for real property ownership and transfer, provides a mechanism for creating securities over property and sets out clearer provisions for enforcement of private property rights. It represents China's first comprehensive national framework for the protection of property.

Environmental approvals process

Key environmental laws in China are enacted at the national level, with most enforcement and implementation occurring at the local level. As a result, environmental protection laws can be enforced differently in different provinces or municipalities. Local regulations are also allowed to be more stringent than national regulations.

Projects could be impacted by a range of different laws and regulations, including those which govern conservation, pollution, contamination, and employee health and safety. Enforcement of these laws and regulations is undertaken by the relevant government authority and remedies may include warnings, fines, administrative sanctions, civil compensation for losses, restraints on construction or operation, or criminal prosecution.

Generally, environmental laws in China adopt a “polluter pays” approach. However, pursuant to other laws and regulations, liability for pollution on the land can extend to others, especially in cases when the polluter cannot be located or cannot be clearly determined. For instance, companies which acquire or merge with another company that holds land use rights can be held responsible for environmental harm connected with that land – that is, “buyer beware” principles can apply.

Depending on the type and size of the project, environmental assessments are approved by either the State Environmental Protection Administration (*SEPA*) or Environmental Protection Bureaus (*EPBs*) at the provincial or municipal levels.

Since environmental laws are enforced by EPBs at the provincial/municipal level, it can be important to engage local authority support for the project (sometimes this is made easier where the project involves local companies and/or where the project generates local benefits). However, SEPA may suspend approvals for new projects if local governments do not comply with the applicable requirements under environmental laws and regulations, so risks remain even if a project has broad local support.

The following diagram shows the environmental approvals process for projects in China – note that final approval is not granted until after work is commenced, which could be expensive for developers who commence work but do not receive final approval.

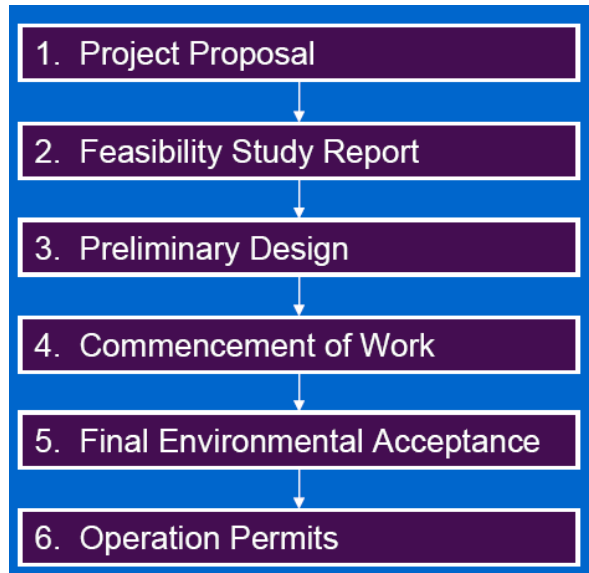


FIGURE 2: ENVIRONMENTAL APPROVALS PROCESS IN CHINA

Power purchasing agreement / concession contract

It is important to secure a buyer for the energy output and any CERs on terms that take account of regulatory, market or resource risks, as well as meeting any prerequisites for favourable tax treatment, tariffs or other concessions.

Buyers will generally be seeking a renewable energy supply that will comply with regulatory obligations or consumer demand. Therefore, they will want terms that limit or compensate for compliance risks and ensure the buyer will not have financial commitments for energy supply that fall short of expectations. Project proponents (and their financiers) will ordinarily seek to see a secure and constant revenue stream (with tolerable variation for resource, market or regulatory risks).

Appendix 1 – Abbreviations

ABBREVIATION	DEFINITION
CDM	Clean Development Mechanism of the Kyoto Protocol
CER	Certified Emission Reduction from a CDM project
CJV	Contractual Joint Venture
CREIA	Chinese Renewable Energy Industry Association
Development Plan	Medium and Long-Term Development Plan for Renewable Energy in China, issued by the NDRC in September 2007
DRC	Development and Reform Commission, eg of a province
EJV	Equity Joint Venture
EPB	Environmental Protection Bureau
ERPA	Emissions Reduction Purchase Agreement
FIE	Foreign Investment Enterprise
June 2007 Report	Report on China's renewable energy law, prepared as part of the RE Law Assist project (discussed in section 1.2). It was circulated in June 2007 and is available at: http://www.bakernet.com/BakerNet/Resources/Publications/Recent+Publications/Renewable+Energy+Law+in+China.htm
JV	Joint Venture
MRET	Mandatory Renewable Energy Target (Australia)
NDRC	National Development and Reform Commission of China
NDRC Price Measure	Provisional Administrative Measures on Pricing and Cost Sharing for Renewable Energy Power Generation (NDRC Price [2006] No.7)
REC	Renewable Energy Certificate
SEPA	State Environmental Protection Administration
SERC	State Electricity Regulatory Commission of China
SPC	State Power Corporation
State Council	National council led by the Chinese Premier, responsible for exercising all powers (unless delegated to provincial governments). The State Council enacts administrative rules.
WFOE	Wholly foreign-owned enterprise

Appendix 2 – Summaries of implementing measures, regulations and policies

1. Overview of implementing measures

AREA	SECTIONS OF RENEWABLE ENERGY LAW	REGULATIONS, POLICIES, GUIDANCE AND TECHNICAL STANDARDS
Targets	4, 7, 9	Medium and Long-Term Development Plan for Renewable Energy in China
Price Setting	19, 22, 23	Provisional administrative measures on pricing and cost sharing for renewable energy power generation (NDRC Price [2006] No. 7)
Cost Sharing	20, 21	Provisional administrative measures on pricing and cost sharing for renewable energy power generation (NDRC Price [2006] No. 7) Renewable energy surcharge level regulation (NDRC Price [2006] No. 28-33) Provisional regulation on renewable energy surcharge balancing (NDRC Price [2007] No. 44) Temporary measures of additional income regulation of renewable energy power (NDRC November 2007)
Grid Connections	21, 29, 30	Measures on supervision and administration of grid enterprises in the purchase of renewable energy power (SERC [2007] No. 25)
Approvals	2, 13	Guiding catalogue for development of the renewable energy industry (NDRC Energy [2005] No. 2517)
Investment Incentives	24, 25, 26	Provisional administrative measures on the Renewable Energy Development Fund (MoF Economic and Construction [2006] No. 237)
Technical Standards	11, 17	Various – see section 3.7
Resource Data	6, 24	Not yet established

2. Overview of regulations

TITLE	STATUS	DATE	PUBLISHED BY / REFERENCE	TYPE OF RE	DESCRIPTION
Provisional administrative measures on pricing and cost sharing for renewable energy power generation	Provisional	2006	NDRC Price [2006] No.7	All	Sets out the principles for renewable energy power pricing and cost sharing. In particular, it identifies the level of wind and biomass power pricing and clarifies all costs related to renewable energy power that will be covered by the renewable energy surcharge.
Renewable energy surcharge level regulation	Approved	2006	NDRC Price [2006] No.28-33	All	Establishes the tax-exempt renewable energy surcharge (¥0.001 per kWh) payable by end users of electricity. This cost sharing arrangement mandates that end users pay a proportion of the higher cost of providing renewable energy, as well as the cost of connecting renewable energy facilities to the grid.
Provisional regulation on renewable energy surcharge balancing	Provisional	2007	NDRC Price [2007] No.44	All	Identifies the procedure for provincial power utilities to collect the renewable energy surcharge, the methodology for allocating this revenue amongst the provinces, and the role of the monitoring body in this process.
Temporary measures of additional income regulation of renewable energy power	Provisional	2007	NDRC, November 2007	All	Provides definitions and instructions relating to renewable energy additional income, additional taxation, taxation scope, quota trading and cost sharing plans. ⁴²
Regulation on the administration of power generation from renewable energy	Approved	2006	NDRC Energy [2006] No.13	All	Sets out approval procedures for renewable energy projects and further identifies the responsibilities of utilities and power generators. Provides that utilities are obliged to allow renewable energy facilities to connect to the grid.
Guiding catalogue for the renewable energy industry development	Approved	2005	NDRC Energy [2005] No.2517	All	Identifies the renewable energy technologies that will be supported by the government and identifies the economic policy instruments that will apply to these.
Provisional administrative measures on the renewable energy development fund	Provisional	2006	MoF Economic and Construction [2006]	All	Sets out the criteria for the use of the Renewable Energy Development Fund, identifies "priority areas", and provides application and approval procedures.

⁴² Report on the Development of the Photovoltaic Industry in China (2006-2007), China Renewable Energy Development Project, June 2008

TITLE	STATUS	DATE	PUBLISHED BY / REFERENCE	TYPE OF RE	DESCRIPTION
			No.237		
Regulation governing the use of the renewable energy development fund to promote renewable energy integration in buildings	Approved	2006	MoF and MoC [2006] No. 460	All	Together with the 'Notice on the approach to appraisalment of pilot projects for renewable energy integration in buildings', sets out how the Renewable Energy Development Fund will be used to promote the integration of renewable energy in buildings, the application and approval procedures and the criteria for project selection.
Regulation on the management of bio-ethanol projects	Approved	2006	MOF Construction [2006] No. 460	Biofuel	Sets out the policy for bio-ethanol development, imposes stricter market-entrance standards, project management and supervision requirements, and streamlines the administration system
Regulation of the construction and management of wind farms	Approved	2006	NDRC Energy [2006] No. 1204	Wind	Obliges local government authorities to develop local wind energy development plans (for facilities smaller than 50MW) according to wind resource availability. The wind tariff is still determined by the State Council through a tender process.
Medium and long-term development plan for renewable energy in china	Approved	September 2007	NDRC	All	Sets renewable energy targets by technology type, sets out guiding principles for the development of renewable energy, and notes the national policies and measures to achieve these objectives.
Measures on supervision and administration of grid enterprises in the purchase of renewable energy power	Approved	2007	SERC [2007] No. 25	All	This regulation requires the national grid authority and national standards authority to draft grid connection and power purchase standards to ensure the safety of the grid when it receives electricity from renewable energy sources.
Rural biomass industry development plan for 2007-2015	Approved	May 2007	Agriculture Plan No. 18 [2007]	All	The Ministry of Agriculture will draft a rural bioenergy plan, as required by the Renewable Energy Law, for the development of rural bioenergy for the period 2007-2015. It will cover biogas utilization, biomass power generation and other areas.

3. Overview of policy guidance

TITLE	PUBLISHED BY / DATE	TYPE OF RE
Opinion on the use of the renewable energy development fund to promote the wind industry	NDRC & MoF	Wind
Notice to promote the development of the biofuel industry through support for project construction	NDRC & MoF	Biofuel
Notice on appraisal approach on pilot projects of renewable energy applied buildings	MoF and MoC, 2006	All
Opinion on fiscal supporting measures to promote bio-energy and bio-chemical industry development	MoF	Biofuel / Biomass
Notice to strengthen solar water heating system utilization	NDRC and MoC, 2007	Solar
Subsidy for renewable energy electricity price and quota trade	2007	All

Appendix 3 – Wind power tariffs

Source: CREIA

APPROVED PROJECTS AND TARIFFS (BEFORE 2006)

PROJECTS APPROVED	PRICE (AVERAGE TARIFF IN THE OPERATION PERIOD) YUAN/KWH, INCL TAX
Zhurihe, Inner Mongolia	0.5918
Huitengxile, Inner Mongolia	0.5918
Shangdu, Inner Mongolia	0.5918
Xilinhaote, Inner Mongolia	0.6291
Dale, Inner Mongolia	0.6574
Zhangbei, Hebei	0.984
Factory No.1 Dabancheng, Xinjiang	0.4
Factory No. 2, Dabancheng, Xinjiang	0.66
Donggang, Liaoning	0.9154
Dalian Hengshan, Liaoning	0.9
Cangnan, Zhejiang	1.2
Hainan Dongfang	0.56
Guangdong Nan'ao	0.74
Guangdong Nan'ao Zhenneng	0.62
Guangdong Nan'ao Dannan	0.46
Fujian Dongshang Aoziaishan	0.46
Gansu Yumen	0.73
Jilin Tongyu	0.9
Shanghai Chongming	0.773

CONCESSION TARIFF (2006, YUAN/KWH)

LOCATION	WITHOUT VAT	WITH VAT (8.5%)
Jiangsu Rudong, Huarui Co., Ltd	0.402	0.437
Guangdong Shbeishan, Yuedian, Group Co., Ltd	0.462	0.501
Inner Mongolia, Huitengxile, Beijing International Power New Energy Co.	0.352	0.382

LOCATION	WITHOUT VAT	WITH VAT (8.5%)
Jinlin Tongyu, Longyuan Power Group Co.	0.470	0.510
Jilin baicheng, Huaneng	0.470	0.510
Jiangsu Rudong, Longyuan	0.478	0.519
Jiansu Dongtai, Huadian International	0.449	0.487
Gansu Anxi, Huanghe Power	0.425	0.462
Inner Mongolia, Huitengliang, Guangdong Nuclear	0.374	0.406
Inner Mongolia, Baotou Bayin, Longyuan	0.429	0.466
Hebei Danjinghe, China Energy conservation	0.461	0.501
Average	0.434	0.471

WIND POWER PRICE BY REGION (2006, YUAN/KWH)

REGION	PROJECT	WITHOUT VAT	WITH VAT (8.5%)
Shandong	Qixia 49.5MW	0.719	0.780
	Rongcheng 49.5MW	0.700	0.760
	Laizhou 49.5 MW	0.599	0.650
	Zhanhua 49.5	0.618	0.670
	Hekou 49.5 MW	0.645	0.700
	Dawang 49.5 MW	0.487	0.529
	Average	0.628	0.681
Inner Mongolia	Chifeng Saihanba West 30.6 MW	0.507	0.550
	Huitengxile Windfarm Project	0.461	0.500
	Huitengliang 49.5MW	0.525	0.570
	Chifeng Dongshan 49.3MW	0.502	0.545
	Saihanba East 45.05 MW	0.507	0.550
	Saihanba North 45.05 MW	0.507	0.550
	Average	0.502	0.544

REGION	PROJECT	WITHOUT VAT	WITH VAT (8.5%)
Jiangsu (bid prices)	Rudong Huangang 200 MW	0.478	0.519
	Dongtai 200 MW	0.449	0.487
	Jiangsu dongtai 200 MW	0.449	0.487
	Jiangsu rudong 100 MW	0.402	0.437
	other 4 projects with 200 MW each	0.449	0.487
	Average	0.445	0.483
Fujian	Dongshan Wujiaobay 30MW Wind Power Project	0.599	0.650
	Zhangpu Liuaio 30.6 MW Wind Power Project	0.496	0.538
	Average	0.548	0.594
Ningxia	Helanshan Wind-farm Project 49.5 MW	0.524	0.568
	Ningxia Tianjing 50.25MW	0.470	0.510
	Tianjing Shenzhou 30.6MW	0.516	0.560
	Average	0.503	0.546
Hebei	Chengde Songshan 49.5 MW	0.553	0.600
	Zhangbei Manjing 49.5MW	0.602	0.653
	Kangbao Wolongtushan 30 MW	0.553	0.600
	Zhangbei Mijiagou 49.5 MW	0.553	0.600
	Hebei Shangyi Manjing East 49.4 MW	0.553	0.600
	Average	0.563	0.611
Xinjiang	Sanchang First Phase 34.5 MW	0.433	0.470
	Tuoli Wind-Farm 30 MW	0.399	0.433
	Average	0.416	0.452
Heilongjiang	Huafu Muling 49.5 MW	0.607	0.659
	Yichun Erduoyan 28.05 MW	0.612	0.664
	Yichun Daqingshan	0.612	0.664
	Liaoning Kangping 24.65MW	0.645	0.700
	Average	0.619	0.672

REGION	PROJECT	WITHOUT VAT	WITH VAT (8.5%)
Liaoning	Changtu Windfarm Project	0.604	0.655
	Zhangwu 24.65MW	0.645	0.700
	Average	0.624	0.678
Jilin	Taobei Huaneng 49.3MW	0.559	0.607
	Datang Shuangliao 49.5 MW	0.544	0.590
	Taobei Fuyu 49.5MW	0.512	0.556
	Changling Wind 24 MW	0.599	0.650
	Taonan 49.5 MW	0.546	0.592
	Average	0.552	0.599
Guangdong with fixed price		0.487	0.528
Overall average		0.544	0.590

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